



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD ANAESTHESIOLOGY

(Revised with effect from 2019-2020 onwards)

PROGRAM OUTCOMES

PO1: Competence to practice independently the art and science of Anaesthesiology and Resuscitation effectively and ethically, backed by scientific knowledge and skill base.

PO2: The competence to undertake responsibilities in critical care unit, trauma unit, and respiratory therapy unit of unconscious patients requiring ventilatory support.

PO3: The competence to undertake acute and chronic pain management.

PO4: Attitude to continue professional development irrespective of whether he is in a teaching institution or in private anaesthetic practice.

PO5: The ability to be a dedicated, motivated teacher who is always keen to train or to share his knowledge and skills with a colleague or junior or any learner.

Program Specific Outcomes:

PSO1: Knowledge of the anaesthetic management of common and uncommon surgical ailments belonging to various branches of surgery, at all ages requiring operative interventions with a basic knowledge of the aetiology, Pathophysiology and the surgical treatment of the conditions

PSO2: Ability to perform 'Pre-Anaesthetic Evaluation' of patients undergoing surgery by taking proper clinical history, examining the patients, ordering relevant investigations and interpreting them to have additional information about the surgical condition and the associated medical condition which warrant the modification of the proposed anaesthetic management

PSO3: Competence to administer anaesthesia (general and or regional) to common surgical operations independently and to super specialisations like cardiac surgery, neurosurgery etc with the help of a senior anaesthesiologist

PSO4: Knowledge of the underlying theoretical background of mechanism pain perception and pain management

PSO5: Knowledge of the theory of underlying aetiology, mechanism and management of the conditions requiring resuscitation

PSO6: Manage airway and perform ventilatory care etc. of unconscious and polytrauma cases by a member of trauma team and critical care unit team

PSO7: Competence to advise regarding the anaesthetic management of any surgical case and to carry on this management effectively

PSO8: Undertake complete patient monitoring including preoperative ventilatory care of the patients

PSO9: Perform acute and chronic pain management

PSO10: Knowledge regarding the medicolegal aspects of anaesthesia

PSO11 Undertake audit, use information technology tools and carryout research,

both basic and clinical with the aim of publishing the work and presenting the same at various scientific for a

PSO12:Respect patient's rights and privileges including right to information and right to seek a second opinion

Goals:

The goals of three year degree course in Anaesthesiology would be to train a MBBS doctor who after the satisfactory completion of which shall:

1. Practice independently the art and science of Anaesthesiology and Resuscitation effectively and ethically, backed by scientific knowledge and skill base.
2. Undertake responsibilities in critical care unit, trauma unit, and respiratory therapy unit of unconscious patients requiring ventilatory support.
3. Undertake acute and chronic pain management.
4. Continue to evince keen interest in continuous professional development irrespective of whether he is in a teaching institution or in private anaesthetic practice.
5. Be a dedicated, motivated teacher who is always keen to train or to share his knowledge and skills with a colleague or junior or any learner.

Objectives:

The following objectives are laid out to achieve the goals of the course. These objectives have to be achieved by the candidates by the time of completion of the course. The objectives may be considered under the following headings.

1. Knowledge (cognitive domain)
2. Skills (Psychomotor domain)
3. Attitudes communication skills, human values and ethical practice

At the end of the training the candidate must be able to:

Knowledge:

- ☐ Demonstrate understanding of basic sciences relevant to anaesthesia
- ☐ Describe the anaesthetic management of common and uncommon surgical ailments belonging to various branches of surgery, at all ages requiring operative interventions with a basic knowledge of the aetiology, Pathophysiology and the surgical treatment of the conditions

- ☐ Describe the underlying theoretical background of mechanism pain perception and pain management
- ☐ Describe the theory of underlying aetiology, mechanism and management of the conditions requiring resuscitation
- ☐ Recognise the conditions that may be outside the areas of his competence and refer them to an appropriate specialist prior to anaesthetising them
- ☐ Advise regarding the anaesthetic management of any surgical case and to carry on this management effectively
- ☐ Update himself/herself by self-study and by attending courses, conferences and seminars relevant to anaesthesia
- ☐ Teach and guide his team colleagues and students
- ☐ Demonstrate understanding of medicolegal aspects of anaesthesia
- ☐ Undertake audit, use information technology tools and carryout research, both basic and clinical with the aim of publishing the work and presenting the same at various scientific fora

Skills:

- ☐ Perform 'Pre-Anaesthetic Evaluation' of patients undergoing surgery by taking proper clinical history, examining the patients, ordering relevant investigations and interpreting them to have additional information about the surgical condition and the associated medical condition which warrant the modification of the proposed anaesthetic management
- ☐ Administer anaesthesia (general and or regional) to common surgical operations independently and to super specialisations like cardiac surgery, neurosurgery etc with the help of a senior anaesthesiologist
- ☐ Provide Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS)
- ☐ Manage airway and perform ventilatory care etc. of unconscious and polytrauma cases by a member of trauma team and critical care unit team
- ☐ Undertake complete patient monitoring including preoperative ventilatory care of the patients
- ☐ Perform acute and chronic pain management

Attitudes and communication abilities:

- ☐ Adopt ethical principles in all aspects of his anaesthetic practice. Professional honesty and integrity are to be fostered. Anaesthesia care is to be delivered to all in need, irrespective of the social status, caste, creed or religion of the patient

- Develop communication skills, in particular the skill to explain the various options available in the anaesthetic management, critical care, pain management and to obtain a true informed consent from the patient
- Provide leadership in the operating room environment and get best out of the team in a congenial working atmosphere
- Apply high moral and ethical standards while carrying out human or animal research
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed
- Respect patient's rights and privileges including right to information and right to seek a second opinion

Course Contents:

It includes topics not only of Anaesthesiology but also those aspects of all the other branches of medicine relevant to Anaesthesia viz. Medicine and its allied subjects, surgery and its allied branches, Pediatrics, applied anatomy, physiology, pathology, pharmacology, microbiology etc. It is intended as a guide to the candidates and it is not comprehensive. As and when there is newer development, it becomes eligible for inclusion. Hence, the candidates should be familiar themselves with the current content of the scientific journals and reviews of major topics, in Anaesthesia.

1. History of anaesthesiology
2. Basic sciences related to anaesthesia including Anatomy, Physiology, Pharmacology, Biochemistry, Pathophysiology, Immunology and Genetics
3. Medicine applied to Anaesthesiology
4. Physics related to Anaesthesiology, Electronics, Computers and Lasers, in Anaesthesiology, Internet/Medicine and its uses and applications
5. Anaesthesiology
 - i. Pre anaesthetic evaluation and preparation
 - ii. Principles and practice of Anaesthesiology including pre per and post operative care, of patients belonging to General Surgery and other sub specialties like Cardiothoracic Surgery, Neurosurgery, Orthopaedics, Plastic Surgery and Surgical Endocrinology, Surgical Oncology, Paediatrics, Obstetrics and Gynaecology, ENT, Ophthalmology, Urology, Dental Surgery, Laproscopy Surgery, transplant etc..
 - iii. Blood transfusion- Fluid and Electrolyte balance- Acid Base Balance
 - iv. Fires and Explosion in operation theatre
 - v. Operation theatre sterilization procedures

6. Pain clinic organization and management, Pain pathway and management of pain
7. Respiratory therapy and management of both acute and chronic respiratory insufficiencies and ventilator commitments in ICU
8. Critical Care Anaesthesiology and Trauma Care Unit management
 - ☐ Different methods of anaesthetic techniques
 - ☐ Regional anaesthesia including spinal, epidural and caudal etc
 - ☐ Local anaesthesia including nerve blocks
 - ☐ Anaesthesia in abnormal environments like high altitude anaesthesia etc
 - ☐ Anaesthesia for day care surgery
 - ☐ Anaesthesia for diagnostic procedure like endoscopy CT scan, MRI etc..
 - ☐ Diagnosis of brain death
 - ☐ Physiological support of the organ donor
 - ☐ Acute care of trauma victims
 - ☐ Management of severe head injury and spinal injury
 - ☐ Management of patients in sepsis
 - ☐ Management raised ICP
9. Informed consent/medicolegal issues: understanding the implications of acts of omission and commission in practice. Issues regarding consumer protection implications in medicolegal cases
10. Communications skills with colleagues teachers, patients, and patients relatives
11. Principles of Anaesthesia audit understanding the audit process and outcome; methods adopted for the same
12. Essentials of Research methodology:
 - i. Basics of Biostatistics and its application
 - ii. Ability to undertake clinical and basic research
13. Principles of Evidence Based Medicine and its application in anaesthetic practice
14. Medical Ethics/social responsibilities of the anaesthesiologists
15. Record keeping: Ability to keep records as scientifically as possible; knowledge of computers is beneficial

TECHNICAL SKILLS TO BE ACQUIRED

The list within the tables indicates the procedures that the student should by the end of the course, be able to perform independently (PI) by himself/herself, should have performed with assistance (PA) should have observed (O) or assisted (A) during the course. NA – Not applicable

Skills may be considered under the following headings:

1. Basic graduate skills
2. Anaesthesia procedures
3. Critical care procedures
4. Emergency room procedures
5. Pain alleviation procedures

a) Basic graduate skills:

The students should have acquired the certain skills during his undergraduation and internship. There skills have to be reinforced at the beginning of the training period. There include:

Procedure	Category	Year	No.
Insertion of IV lines	PI	1	100
Insertion of Nasogastric tubes	PI	1	100
Recording of vital signs	PI	1	100

b) Anaesthesia procedures:

Orotracheal intubation	PI	I/II/III	100
Nasotracheal intubation	PI	I/II/III	50
LMA insertion	PI	I/II/III	50
Airway (Oral/Nasal)insertion	PI	I/II/III	100
Subarachnoid block	PI	I/II/III	100
Epidural block (including caudal)	PI	I/II/III	10
Brachial plexus block	PI	II/III	5
Intravenous Regional Anaesthesia	PI	II/III	5
Three in one block	PI	II/III	2
Rectus Sheath Block	PI	II/III	2
Hernia block	PI	II/III	2
Other nerve blocks	PI	II/III	NA
Major anaesthesia procedures	PI	II/III (Per year)	100
Minor anaesthesia	PA/PI	II/III	200
procedures		(per year)	

c) Critical Care Procedures:

Insertion of Arterial lines	PI	II/III	5
Insertion of Central Venous Lines	PI	II/III	5
Intercostal drainage	O	II/III	NA
Tracheostomy	O	III	NA
Ventilatory Management of Patients	PI	II/III	NA
Sampling for & Interpretation of ABG	PI	II/III	NA
Correction of Electrolyte imbalance	PI	II/III	NA
Fibreoptic Bronchoscopy	PA	III	NA
Minitracheostomy	PA	III	NA
Insertion of SWG & PA catheter	O	III	NA

d) Emergency Room Procedures:

Cardiopulmonary Resuscitation (BLS & ACLS)	PI	I/II/III	NA
Management of Cardiac failure	PI	II/III	2
Management of Respiratory failure	PI	II/III	2
Management of shock	PI	II/III	2
Management of airway obstruction	PI	I/II/III	5

e) Pain Alleviation Procedures:

Stellate ganglion block	PA	III	2
Coeline ganglion block	PA	III	2
Trigeminal Nerve block	PA	III	2
Labour analgesia	PI	II/III	

Post operative pain management	PI	II/III	100
Neurolysis & Other nerveablation procedures	PA	III	2
TENS	PI	II/III	2

Teaching and learning activities

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying post graduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

1. Lectures : Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a) Diabetic lectures : Recommended for selected common topics for post graduate students of all specialties. Few topics are suggested as examples:

1. Bio-statistics
2. Use of library
3. Research Methods
4. Medical code of conduct and medical ethics
5. National health and disease control programs
6. Communication skills etc
7. Initial introductory lectures about the subject

These topics may preferably taken up in the first few weeks of the 1st year.

b) Integrated lectures : These are recommended to be taken by multidisciplinary teams for selected topics, eg. Diabetes Mellitus, Thyroid etc.

- 2. Journal club** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must make a presentation from the allotted journal(s) of selected articles at least four times a year and a total of 12 presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A time table with names of the students and the moderator should be announced at the beginning of every year.
- 3. Subject seminar** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the logbook relevant details. Further, every candidate must present on selected topics at least four times a year and total of 12 seminar in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.
- 4. Student symposium** : Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.
- 5. Ward rounds** : May be service rounds or teaching rounds.
 - a) Service rounds : Post graduate students should do ward rounds every day
 1. For anaesthetic evaluation of the patients posted for operation
 2. And to do the post anaesthetic follow up of operated patients for alleviation of post operative pain and for diagnosis and management if any of the post operative sequelae
 - b) Teaching rounds : Every unit should have grand round for teaching clinical methods and pre anaesthetic evaluation
Entries of (a) and (b) should be made in the log book
 - c) ICU rounds : Everyday ICU rounds with senior consultant regarding progress and plan for patient which should include in the teaching programme.
- 6. Mortality and morbidity meetings** : Recommended once a month for all postgraduate students. Presentation is done by rotation and by the students who had conducted/assisted anaesthetic management.
- 7. Inter departmental meetings** : strongly recommended particularly with departments of surgery and medicine at least once a month. These meetings

should be attended by post graduate students and relevant entries must be made in the logbook.

- 8. Teaching skills :** Post graduate students must teach undergraduate students (eg. Medical, Nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by faculty. Record of their participation should be kept in log book. Training of post graduate students in educational technology is recommended.
- 9. Continuing medical education programmes (CME) :** At least 2 state/national level CME programmes should be attended by each student in 3 years.
- 10. Conferences :** Attending conferences is optional. However participation and presentation of scientific paper should be encouraged.

Dissertation :

Every candidate pursuing MD degree course in Anaesthesiology is required to carry out work on a selected project under the guidance of recognized post graduate teacher. The results of such a work shall be submitted in the form of dissertation.

1. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, searching about review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.
2. Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within 4 months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.
3. Such synopsis will be reviewed and the dissertation topic will be registered by the university. No changes in the dissertation topic or guide shall be made without prior approval of the university.
4. The dissertation should be written under the following headings:
 - a. Introduction
 - b. Aims or Objectives of the study
 - c. Review of Literature
 - d. Material and methods
 - e. Results
 - f. Discussion
 - g. Conclusion
 - h. Summary
 - i. References

- j. Tables
 - k. Annexure
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- 5. The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other checklists. It should be neatly typed in double line in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the institution.
 - 6. Four copies of dissertation thus prepared shall be submitted to the University, 6 months before final examination on or before the dates notified by the University.
 - 7. The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the university examination
 - 8. Guide : The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work shall be as per Medical Council of India Minimum qualifications for Teachers in Medical institutions regulations 1998. Teachers in medical college/institution having a total of eight years teaching experience out of which at least 5 years teaching experience as lecturer or assistant professor gained after obtaining post graduate degree, shall be recognized as post graduate teachers.
A co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/training by the University/Medical Council of India. The co-guide shall be a recognized post graduate teacher.
 - 9. Change of guide : In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.
 - 10. For some more details regarding guide etc. please see chapter 1 and for books on research methodology, ethics, etc, see Chapter IV.

Rotation and posting in other departments

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic sciences, allied departments and specialty departments are given below. The total duration of postings in allied and sub specialties will be 8 months and the remaining 2 years and 4 months in mother department.

Basic sciences:

Rotation in these departments viz. Anatomy, Physiology, Pharmacology etc are to be done as concurrent studies during the 1st year of training, at least 6two hours may be spent in the first six months of the course. Basic sciences relevant to Anaesthesia can be studied in the respective departments in the afternoons.

Anatomy :

Special emphasis for the dissection of larynx, heart, various nerves and plexus.

Physiology :

Thorough revision of all the system, in particular Cardio Vascular System, and Respiratory system.

Pharmacology :

Of drugs used in Anaesthesia and drugs used for management of systemic disease and drug interactions

Allied Speciality:

Students should be posted ICU, ICCU, SICU (Trauma unit) and pain clinic during 2nd year of training of 2 weeks in each, for total duration of 2 months.

Other sub specialities of anaesthesia:

Posting to other sub speciality departments will be during 2nd year and the duration of postings are as under :

Cardiothoracic surgery	:	6 weeks	
Neurosurgery	:	4 weeks	
Paediatric surgery	:	6 weeks	
Cancer surgery	:	4 weeks	
Oromaxillary surgery	:	2 weeks	32 weeks
Plastic surgery	:	2 weeks	
Urology	:	4 weeks	
Laposcopic and Endoscopic surgery	:	2 weeks	
Anaesthesia for investigative procedure like CT scan, Lithotripsy, Cardiac cath lab:		2 weeks	

Courses:

Paper 1 : Basic science as applicable to anaesthesia. (U19MDAN01)

CO1: Knowledge of Anatomy, physiology and pharmacology necessary in the practice of anaesthesiology.

CO2: Understanding of the Physics involved in the function of equipment used in Anaesthesia.

CO3: Knowledge of biochemistry involved in anaesthesia.

CO4: Understanding the Patho Physiology of diseases which can increase risk during anaesthesia.

CO5: History of development of anaesthesia.

CO6: Competency in the use of the equipments used in anaesthesia.

Anatomy :

Special emphasis for the dissection of larynx, heart, various nerves and plexus.

Physiology :

Thorough revision of all the system, in particular Cardio Vascular System, and Respiratory system.

Pharmacology :

Of drugs used in Anaesthesia and drugs used for management of systemic disease and drug interactions

Allied Speciality:

Students should be posted ICU, ICCU, SICU (Trauma unit) and pain clinic during 2nd year of training of 2 weeks in each, for total duration of 2 months.

Paper II : Clinical Practice of Anaesthesia (U19MDAN02)

CO1: Knowledge of cardio vascular system and respiratory system necessary in the practice of anaesthesiology.

CO2: Knowledge of Neuro surgery, Obstetrics and Gynaecology, Orthopaedics and Ophthalmology

Pre anaesthetic evaluation and preparation

Principles and practice of Anaesthesiology including pre per and post operative care, of patients belonging to General Surgery and other sub specialties like Cardiothoracic Surgery, Neurosurgery, Orthopaedics, Plastic Surgery, Ophthalmology, Laproscopy Surgery, transplant etc..

Paper III : Clinical practice of anesthesia (U19MDAN03)

- CO1: Knowledge of the specialties of paediatrics, geriatrics, ENT.
- CO2: Knowledge of Renal & Hepatic system, Endocrines and Haemopoietic system.
- CO3: Competency in Out patient anaesthesia & dental anaesthesia
- CO4: Competency to administer Nerve Blocks

Principles and practice of Anaesthesiology including pre and post operative care, of patients belonging to Surgical Endocrinology, Surgical Oncology, Paediatrics, ENT, Ophthalmology, Urology, Dental Surgery, Laproscopy Surgery, transplant etc , and competency in performing nerve blocks

Competency in giving epidural analgesia in second stage of labour

Dental anesthesia

Anesthesia in pediatrics

Paper IV : Applied medicine in relation to anaesthesia (U19MDAN04)

- CO1: Knowledge in the theoretical aspects of pain.
- CO2: Competency in pain relief, in the post operative period.
- CO3: Competency to manage cancer pain.

Competency in Pain clinic organization and management, Pain pathway and management of pain mainly cancer pain and also during post operative period

Soft Skills (MDAN5) – Elective Course

- CO1: The ability to practice the specialty in an ethical manner.
- CO2: The ability to work as a member/leader of a healthcare team.
- CO3: Teaching abilities.
- CO4: Attitude to be a lifelong learner.

Values such as the adoption of ethical principles, professional honesty and integrity would be inculcated in the student during the training. These include, but is not limited to a) Communication skills with patients, caregivers and colleagues b) Attitude to be a lifelong learner c) Competency to be a good teacher & d) Ability to work as the member of a team. These will be assessed by 360 degree evaluation.

Year wise structured training schedule

First year :

1. Basic sciences related to Anaesthesiology, Theoretical knowledge, frequent visits to Anatomy dissection halls and Museum, Physiology Laboratories etc. to revise the relevant subjects.
2. Theoretical knowledge of Anaesthesiology & Resuscitation : Special emphasis on clinical examination of patients, learning clinical methods, arriving at correct diagnosis.
3. Basic knowledge about :
 - a. Computers in anesthesia, medicine, internet
 - b. Bio statistics
 - c. Medical audit
 - d. Medico legal aspects
 - e. Research Methodology
 - f. Evidence based medicine
 - g. Medical ethics, social responsibilities of anaesthesiologists
4. Learning of communications skills
5. Anaesthesia skills
 - a. Pre anaesthetic evaluation/under supervision
 - b. Monitoring of patients through out peri operative period
 - c. Management of Spinal Headache
 - d. Assisting setting up of Anaesthesia machine, Monitor & Ventilator
 - e. Assisting the conduct of anaesthesia for major surgeries, knowledge about the complications of anaesthesia
 - f. Assisting for short anaesthesia initially and later on doing independently under supervision
 - g. Conduct of anaesthesia OPD
 - h. Conduct of Pre Anesthesia Clinic
 - i. CPR training and mastering of BLS & ACLS
 - j. Anesthesia in Geriatric Age group

6. Dissertation : Choosing a topic of dissertation, submission of synopsis to the university, collection of literature, conduct of pilot studies.

Second year :

1. Theoretical knowledge of allied subjects, sub specialities of anaesthesia, assisting senior anesthesiologists in specialised branches like paediatric surgery, cardiothoracic surgery, critical care trauma etc.
2. Anaesthetic skills : At the end of 2nd year the student should be capable of :
 - a. Anaesthetising patients without assistance but under supervision
 - b. Identifying the complication of anaesthesia and manage them independently but under supervision
 - c. Setting up of Anaesthesia machine, monitor and ventilator independently
3. Conference & workshops : Attending one state level and one national level conference/CME and presentation of a scientific paper.
4. Dissertation : Carrying out of the dissertation study work, periodic review, interaction with guide. Organization of the date writing up of the manuscript of dissertation at the end of 2nd year.
5. the student should be actively involved in presentation of seminars, journal clubs, case presentations/discussions.

Third year :

1. The student should be well versed with basics, allied subjects and recent advances in the respective fields.
2. Anaesthesia skills – at the end of the 3rd year the candidate should be able to make independent decisions as regards anaesthesia pain management and post operative care of all kinds of patients.
3. Teaching activities – Final year student should take lead in conducting seminars, journal clubs, case discussions, panel discussions with 1 and ii year students. The third year students should also involve in teaching undergraduate students specially bed side clinics.
4. Dissertation : The completed dissertation must be submitted to the University, 6 months before the examination before the notified date.
5. The student must get expertise in the specialised procedures as noted in the course content table.

Monitoring Progress of studies

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves,. The monitoring be done by the staff of the department based on participation of students in various teaching/learning

activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in chapter IV.

The learning outcomes to be assessed should include:

1. Personal attitudes
2. Acquisition of knowledge
3. Clinical and operative skills and
4. Dissertation
5. Teaching skills

1. Personal attitudes:

The essential items are:

- a. Caring attitudes
- b. Initiative
- c. Organisational ability
- d. Potential to cope with stressful situations and undertake responsibility
- e. Trustworthiness and reliability
- f. To understand and communicate intelligibly with patients and others
- g. To behave in a manner which establishes professional relationships with patients and colleagues
- h. Ability to work in team
- i. A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

2. Acquisition of knowledge :

The methods used comprise of "Log Book" which records participation in various teaching/learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

Journal review meeting (journal club) : The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed.

The assessment is made by faculty members and peers attending the meeting using checklist (see model checklist –1, Chapter IV)

Seminars/Symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio-visual aids to be assessed using a checklist (see model checklist – II, Chapter IV)

Clinico-pathological conferences : This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenters are to be assessed using a check list similar to that used for seminar.

3. Clinical skills :

Day to Day work : Skills in outpatient and ward work, should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model checklist III, Chapter IV)

Clinical meetings : Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see model checklist IV, chapter IV)

Clinical and procedural skills : The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book (Table no.3)

4. Teaching skills

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (see model checklist V, chapter IV)

5. Dissertation in the Department

Periodic presentations are to be made in the department. Initially, the topic selected is to be presented before submission to the University for registration, again before finalization for critical evaluation and another before final submission of the completed work (see model checklist VI & VII, chapter IV)

6. Work diary/log book

Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the head of the department and head of the institution, and presented in the university practical/clinical examination.

7. Periodic tests

The departments may conduct three tests, two of them be annual tests, one at the end of the first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals/clinical and viva vice.

8. Records

Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log Book

The log book is a record of the important activities of the candidates during his training, internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Format for the log book for the different activities is given in tables 1, 2, and 3 of Chapter IV, copies may be made and used by the institutions.

Procedure for defaulters :

Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination. If she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Scheme of Examination

- A) Written examination shall consist of four question papers each of three hours duration. Each paper shall consist of two long questions carrying 20 marks each

and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows:

Paper 1 : Basic science as applicable to anaesthesia. (U19MDAN01)

- ☐ Anatomy
- ☐ Physiology
- ☐ Pharmacology
- ☐ Physics
- ☐ Biochemistry
- ☐ Patho Physiology
- ☐ History
- ☐ Equipments

Paper II : Clinical Practice of Anaesthesia (U19MDAN02)

- ☐ Cardio vascular system
- ☐ Respiratory system
- ☐ Neuro surgery
- ☐ Obstetrics and Gynaecology
- ☐ Orthopaedics
- ☐ Ophthalmology

Paper III : Clinical practice of anesthesia (U19MDAN03)

- ☐ Paediatrics
- ☐ Renal & Hepatic system
- ☐ Endocrines
- ☐ Haemopolitics
- ☐ Geriatrics
- ☐ ENT
- ☐ Out patient anaesthesia & dental anaesthesia
- ☐ Nerve Blocks

Paper IV : applied medicine in relation to anaesthesia (U19MDAN04)

Theoretical aspects of pain and pain relief including post operative and cancer pain

B) Clinical examinations : (200 marks)

It should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine

and present atleast one long case (carrying 100 marks) and two short cases (each carrying 50 marks). The total marks for clinical examination shall be 200.

C) Viva Voce : (100 marks)

Viva voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 100 and the distribution of marks shall be as under :

i. For examination of all components of syllabus 80 marks

All examiners will conduct viva voce conjointly on candidates comprehension, analytical approach expression and interpretation of data. It includes all components of course contents. In addition the candidate may also be given, instruments/equipments, x-ray images, ABG reports, ECG strips, Drugs Ultrasound/Echocardiography reports and specimen. It includes discussion on dissertation also.

ii. For teaching skills (Pedagogy)..... 20 marks

A topic to be given to each candidate in the beginning of clinical examination. He/she is asked to make presentation on the topic for 8 to 10 minutes.

Maximum marks for	Theory	Practical	Viva	Grand total
MD Anaesthesiology	400	200	100	700

Recommended Books & Journals

1. Practice of Anaesthesiology – Wylie – Churchill-Davidson
2. General Anaesthesia – Gray, Nunn, Utting
3. International practice of anaesthesia 2 volumes – Prys-Roberts
4. Anaesthesia – two volumes, Ronald.D.Miller
5. Clinical Anesthesia- Barash, Cullen, Stoelting
6. Anatomy for Anaesthetist – Harold Willis
7. Essential anatomy for anesthesia – Black/Chambers
8. Understanding Anaesthetist equipments – Dorsh & Dorsh
9. Emergency anaesthesia – Thronton
10. Principles of Obstetric Anaesthesia – J.S.Crawford
11. Obstetric anaesthesia – Principles and practice – David H. Chestnut

12. Physics for anaesthetist – Mushin & Jones
13. Neuro surgical anaesthesia – Hunter
14. Anesthesia and Neurosurgery – Cottrell
15. Clinical neuro anesthesia - Cucchiara
16. Paediatric anaesthesia – Gregory
17. Cardiac Anaesthesia 2 volumes – Kaplan
18. Anaesthesia and co existing diseases – Stoelting
19. Anaesthesia equipment – Ehrenwerth and James.B.Eisonkraft
20. Text book of anaesthesia – Atkenhead, Rowbatham, Smith
21. Smith's Anaesthesia for infants and children – Etsuro K Motoyama
22. Obstetrics anaesthesia and uncommon disorders – Gambling and Douglas
23. Textbook of pain – Wall/Melzack
24. Bonica's management of pain
25. Textbook of regional anesthesia- Raj
26. Clinical anaesthesiology- Morgan
27. Anaesthesia for Orthopaedic surgery
28. Principles of Critical Care – Schmidt/Wood
29. Intensive Care Medicine – Irwin, Cerra, Rippe
30. The ICU book – Marino
31. Mechanical Ventilation – Macintyre/Branson
32. Neural blockade in Clinical Anesthesia and management of pain- Michael J Cousins
33. Thoracic anaesthesia – Jonathan L. Benumof
34. Drugs interactions and other basic medical science and anaesthesia speciality books as available

Journals

1. Anaesthesia and analgesia journal
2. Anaesthesiology journal
3. Anaesthesia journal
4. Acta Anaesthesia Scandinavia
5. Canadian journal of anaesthesia
6. Indian journal of anaesthesia
7. Expert anaesthesia
8. British Journal of anaesthesia
9. Recent advances in anaesthesiology
10. Year book of anaesthesia
11. Anaesthesia clinics
12. Clinics of North America in Anaesthesiology



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program

MD ANATOMY

(Revised with effect from 2019-2020 onwards)

GOAL:

The broad goal of postgraduate students in Anatomy aims at acquiring comprehensive knowledge in macroscopic and microscopic anatomy, surgical, embryological and radiological anatomy and research methodology in anatomy.

OBJECTIVES:**a) KNOWLEDGE**

At the end of the course the postgraduate student shall be able to:

1. Comprehend normal disposition, interrelationships, functional and cross sectional anatomy of the various structures macroscopically.
2. Identify the basic tissues and organs of the body microscopically and correlate their structure with functions in normal and diseased states.
3. Interpret the basic principles and sequential development of organs and systems, recognize the critical stages of development and effects of the common teratogens, genetic mutations and environment hazards.
4. Comprehend the need for research in order to aid and abet basic medical sciences.

b) SKILLS

At the end of the course, the postgraduate student shall be able to:

1. Identify and locate all the structures of the body and the topography of the living anatomy.
2. Identify the organs and tissues microscopically.
3. Identify and interpret normal karyograms, abnormal karyograms and clinical features of common genetic disorders.
4. Identify the critical stages of embryonic development and interpret the effects of common teratogens, genetic mutations and environmental hazards on development.
5. Understand the clinical basis of some important procedures like lumbar puncture, pleural tap, liver biopsy, drainage of abscesses etc., and impart knowledge on these aspects in teaching-learning activities of the department.
6. Interpret the sectional anatomy of the human body and identify various structures which are commonly diseased, on x- ray plates, ultrasound, CT and MRI plates.

c) Program Outcomes

1. To be a competent specialist, teacher and researcher. At the end of the programme he should have mastered most of the competencies pertaining to the speciality and developed a scientific temperament oriented to principles of research methodology.
2. Develop the ability to integrate Anatomy with other specialities
3. Develop skills as a goal directed trainer , recognizing continuing educational needs and practicing the speciality ethically
4. Develop management skills to function as a team leader in teaching and research
5. Develop effective communication skills with students,parents and colleagues

d) Program Specific Outcomes

1. Competency in all subdivisions of anatomy , its applied aspects and recent advances
2. Demonstrate the ability to correlate clinical conditions and their anatomical basis
3. Chalk lesson plans and apply different methods of teaching and learning anatomy should be able to draw up assessment, and develop competence in evaluation techniques.
4. Acquire competency to dissect the entire body.
5. Develop skills in all types of embalming
6. Be competent to prepare and stain slides
7. Should acquire skills to curate a museum
8. Acquire basic skills in research methods, accessing scientific, database, information technology, thesis protocol, review of literature, execution and preparation of report.
9. Should know how to carry out documentation
10. Should have developed organizational skills to conduct symposia and group discussions.
11. Must have a reasonable knowledge of bio-waste management and infection control.
12. Identify socio-economic environmental and overall health of the student community and acquire capacity of not letting personal beliefs and limitations come in the way of duty.

I) SYLLABUS:

1. HUMAN GENETICS

Elements of human genetics, cytogenetics, molecular genetics and tissue culture.

2. ANATOMICAL TECHNIQUES

Knowledge of embalming procedures, museum techniques, histological techniques, advanced neuro-anatomical staining and immuno-histochemical techniques.

3.GROSS ANATOMY (REGIONAL)

UPPER & LOWER EXTREMITIES

Nerves, muscles, vessels, bones and joints to be studied with a wholesome concept and with special reference to surface projections, applied anatomy. Their radiological and developmental significance also need to be studied.

ABDOMEN AND PELVIS

Regions of abdomen, abdominal wall with special reference to inguinal canal, rectus sheath, peritoneum and fascia. The abdominal viscera and their disposition, surface projections, blood supply, nerve supply, lymphatic drainage and applied aspects.

THORAX

Thoracic cage, anatomical and clinical land marks, mediastinum and its subdivisions, pleura, lungs, pericardium and heart.

BRAIN

Coverings, subdivisions, external and internal features including nuclei and their connections and blood supply.

SPINAL CORD

Coverings, blood supply, external features and internal structure including arrangement of various ascending and descending tracts.

HEAD AND NECK

Knowledge of blood vessels, nerves, muscles, glands and viscera.

Neuro anatomy, embryological anatomy, microscopic anatomy, osteology and surgical anatomy pertaining to various regions of the body are to be thoroughly studied.

4. GENERAL AND SPECIAL EMBRYOLOGY INCLUDING TERATOLOGY

5. GENERAL AND SPECIAL HISTOLOGY

6. RADIOLOGICAL ANATOMY

Identification of normal anatomical features in commonly used Skiagrams (Plain and contrast), CT Scan, Ultra Sound, MRI and Endoscopy.

7. SURFACE ANATOMY

Surface marking of those structures, organs and viscera of the body which are commonly affected in various disease processes.

8. SECTIONAL ANATOMY

Knowledge of gross / sagittal / coronal sections of thorax, abdomen, pelvis and limbs, head and neck and brain. To understand interrelations of organs and interpret CTs and MRIs.

9. COMPUTER APPLICATION

Computer in medicine and introduction to use of computer is essential.

10. RESEARCH METHODOLOGY

Research methodology and biostatistics

II) PRACTICAL TRAINING – Includes dissection of all 6 regions of the human body including-Head & Neck, Brain and Spinal cord. Upperlimb, Lower limbs, Thorax and abdomen noting variations if any and their significance.

Pedagogical training through lectures and demonstrations for the undergraduate students in the fields of osteology, radiology, surface anatomy, histology, embryology, clinical anatomy.

Participation and presentation in the departmental seminars and journal club. Training in preparation of tissue mounts using Hematoxylin and Eosin and specialized staining techniques, working knowledge of other types of microscopes.

Training in cytogenetic and karyotyping.

Training in embalming of human adult and foetal cadavers.

Encouraged to make scientific presentations at regional, national and international scientific fora.

Encouraged to publish original scientific data in peer reviewed national and international indexed journals.

Encouraged to attend the workshops to update skills and knowledge.

III) THESIS\DISSERTATION

Every student will prepare a thesis\ dissertation as per the rules laid down by the university.

- 1. Last date for the submission of thesis plan will be within 3 months of joining PG course.**

2. **Guide:** The academic qualification and teaching experience required for recognition as guide for dissertation work is as per Medical Council of India, Minimum Qualification for Teachers in Medical Institutions: Regulations 1998. i.e. recognized post graduate teacher in anatomy having 8 years teaching experience after obtaining postgraduate degree.
3. **Co-Guide** – May be included provided the work requires substantial contribution from a sister department. The co-guide shall be a recognized post graduate teacher.
4. **The last date for submission of thesis:** six months prior to the date of university exams.
5. **Thesis examiners** – Same set of examiners appointed by university as per MCI norms.

LOG BOOK

Every candidate shall maintain a log book and record his /her participation in the training programme conducted by the department. All the presentations and procedures carried out by the candidate should be detailed in this and certified by the teacher concerned. The log book shall be scrutinized and certified by the Head of the Department and the Head of the Institution and presented in the university examination.

Details of the log book is given in APPENDIX -1

V) COURSE OBJECTIVES

Paper - I General Anatomy, Gross Anatomy, Radiological Anatomy, Surface Anatomy and Cross sectional Anatomy. (U19MDAT01)

CO1. Should know the fundamentals of general anatomy and apply it to all subdivisions of anatomy.

CO2. Should have mastered the nerves muscles vessels, joints and viscera of the entire human body.

CO3. Should have a basic understanding of the radiological principles in visualizing the structures of the body and correlate it with cross sectional

anatomy.

CO4. Should be able to mark and project clinically important structures on the surface of the body.

CO5. Communicate effectively using correct discipline specific terminology.

GROSS ANATOMY (REGIONAL)

UPPER & LOWER EXTREMITIES

Nerves, muscles, vessels, bones and joints to be studied with a wholesome concept and with special reference to surface projections, applied anatomy. Their radiological and developmental significance also need to be studied.

ABDOMEN AND PELVIS

Regions of abdomen, abdominal wall with special reference to inguinal canal, rectus sheath, peritoneum and fascia. The abdominal viscera and their disposition, surface projections, blood supply, nerve supply, lymphatic drainage and applied aspects.

Mesentery – anatomy and clinical application

Surface anatomy of all the viscera and its clinical importance

THORAX

Thoracic cage, anatomical and clinical land marks, mediastinum and its subdivisions, pleura, lungs, pericardium and heart.

BRAIN

Coverings, subdivisions, external and internal features including nuclei and their connections and blood supply.

SPINAL CORD

Coverings, blood supply, external features and internal structure including arrangement of various ascending and descending tracts.

Anatomy of spinal nerves and its distribution

HEAD AND NECK

Knowledge of blood vessels, nerves, muscles, glands and viscera.

Neuro anatomy, embryological anatomy, microscopic anatomy, osteology and surgical anatomy pertaining to various regions of the body are to be thoroughly studied.

Paper - II Genetics, Embryology, Histology & Anatomical techniques. (U19MDAT02)

CO 1. Should have a basic understanding of human genetics, cytogenetics, molecular genetics and tissue culture.

CO 2. Should have substantial knowledge of the development of embryo, and systems and should be able to correlate it to congenital anomalies.

CO 3. Should have developed in depth knowledge of cellular structures and specific features of organs and other structures of the body.

CO 4. Knowledge of embalming procedures

CO 5. Should have attained knowledge to mount specimens for the museum and basic model making skills.

CO 6. Should know how to procure, process and stain a tissue

HUMAN GENETICS

**Elements of human genetics, cytogenetics, molecular genetics and tissue culture.
Anatomical variants and genetics**

ANATOMICAL TECHNIQUES

**Knowledge of embalming procedures, museum techniques.
Ethical aspects in the embalming of bodies
Forensic importance of embalming of bodies**

(U19MDAT03) Paper - III Neuro Anatomy including embryology and histology

CO 1. Should have an understanding of the external and internal features of all parts of the brain and spinal cord and their interconnections.

CO 2. Should have basic understanding of the developmental sequence of the nervous system and awareness of common congenital conditions.

CO 3. Should have working knowledge of histological techniques of neuro anatomy.

CO 4. Develop vocabulary of appropriate terminology.

General and Special Embryology including teratology.

(U19MDAT04) Paper - IV Clinical Anatomy, Recent Advances in Anatomy, History of Anatomy

CO 1. Should be able to define the anatomical basis of signs and symptoms of disease.

CO 2. Should be able to demonstrate an understanding of clinical presentations and strategies for health maintenance.

CO 3. Use the clinical anatomical knowledge and correlate it with invasive procedure.

CO 4. Demonstrate information literacy skills to access, evaluate, and stay abreast with current trends in management.

CO 5. Trace the historical development of anatomy as a medical subject

Training in cytogenetic and karyotyping.

Knowledge of gross / sagittal / coronal sections of thorax, abdomen, pelvis and limbs, head and neck and brain. To understand interrelations of organs and interpret CTs and MRIs.

Identification of normal anatomical features in commonly used Skiagrams (Plain and contrast), CT Scan, Ultra Sound, MRI and Endoscopy.

Knowledge of histological techniques, advanced neuro-anatomical staining and immuno-histochemical techniques.

(U19MDAT05) SOFT SKILLS (Elective)

CO 1. Should know how to carry out documentation

CO 2. Should have developed organizational skills to conduct symposia and group discussions.

CO 3. Identify socio-economic environmental and overall health of the student community and acquire capacity of not letting personal beliefs and limitations come in the way of duty.

The candidate can chose to attend soft skills teaching sessions. There will be no written assessment. The candidate will be evaluated throughout the program by the peers.

VI) SCHEME OF EXAMINATION

100 Marks for each Paper (4 Papers) = 400 Marks (Total)

THEORY

Paper-I Gross Anatomy: Including Radiological anatomy

Paper-II Embryology including Teratology, Histology and Genetics

Paper-III Neuroanatomy

Paper-IV Clinical anatomy and Recent advances in anatomy.

PRACTICALS

(DAY-1) PRACTICAL – 1 (3 hours) Total = 100 marks

Dissection and discussion of a given region within - 3 hours.

(DAY-II) PRACTICAL-2 (3 hours) Total = 100 marks

**Identification and discussion of histology, embryology and neuroanatomy slides = 50 marks
Preparation of a stained tissue mount from the given block of tissue = 50 marks**

ORAL (VIVA VOCE) – gross anatomy, related osteology, embryology, radiology and neuro anatomy.

Microteaching = 20 marks

Grand Viva including Surface Anatomy = 80 marks

Note: Minimum of 40 marks must be obtained in each paper. However, the passing minimum aggregate marks of all theory papers will be 200 out of 400 marks.

MODEL QUESTION PAPER

Time: 3 hours

Maximum: 100 marks

Q1	Essay	25 marks
Q2	Essay	25 marks
Q3	Brief essays-5 (10 X 5)	50 marks

Total =		100 marks

VII) BOOKS RECOMMENDED

- 1) **Gray's Anatomy – 39th edition**

Examination	Max. Marks	Min. Marks	No. of Papers	Paper Max.
Theory	400	200	4	100
Practical	200	100	-	-
Oral	100	-	-	-

- 2) **Grant's Dissector, 14e, 39th edition – Dr. Patrick W. Tank**

- 3) **Di Fiore's Atlas of Histology – Victor P. Eroschenko-Lippincott Williams & Wilkins.**

- 4) **Clinical Anatomy by regions –Richard S. Snell- 8th edition**
- 5) **Clinically Oriented Anatomy-Keith L Moore – 5th edition**
- 6) **Cunningham’s Manual of Practical Anatomy – 3 Volumes- 15th edition**
- 7) **The Developing Human-Clinically Oriented Embryology –Keith L Moore**
- 8) **Lang Man’s Medical Embryology –Thomas W. Sadler – 8th edition**
- 9) **Human embryology – Inderbir Singh, G P Pal - 8th edition**
- 10) **Hamilton, Boyd and Mossman's Human Embryology – 2nd edition**
- 11) **Neuro Anatomy – Truex and Carpenter**
- 12) **Clinical Neuro Anatomy-Richard S. Snell**
- 13) **Histological Techniques –John D. Bancroft, 5th edition**
- 14) **Histology: A Text and Atlas – 3rd edition – Michael H Ross, Edward J Reith.**
- 15) **Hams Histology-David Cormack**
- 16) **Cell and Molecular Biology-EDP De Robertis, EMF De Robertis Jr.**
- 17) **Emery’s Elements of Medical Genetics-Robert F Mueller and De Young**
- 18) **Frazer’s Osteology and Anthropometry.**

JOURNALS

1. **Journal of Anatomy London**
2. **Journal of Anatomical Society of India**
3. **Anatomical record.**
4. **Developmental dynamics**



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAMME MD BIOCHEMISTRY

(Revised with effect from 2019-2020 onwards)

MD BIOCHEMISTRY THEORY SYLLABUS

The course content will be distributed as:

Paper I, Biomedical techniques, statistics, biomolecules

Paper II, Intermediary metabolism, inborn errors of metabolism Endocrinology, Biochemistry of muscle contraction

Paper III, Molecular biology, applied chemistry, Immunology

Paper IV, Clinical biochemistry, organ function tests, Nutrition including vitamins

In the second year, students will have hospital postings in clinical laboratories.

Dissertation work will be conducted in the 2nd year

The University examination is conducted at the end of the 6th semester.

Program Outcomes of MD biochemistry

PO: 1 At the end of the course the student is able to demonstrate comprehensive understanding of biochemistry as well as applied disciplines.

PO: 2 Has acquired the competence pertaining to basic instrumentation and procedures pertaining to biochemistry that are required to be practiced in community and at all levels of health care system.

PO: 3 Has acquired skills effectively in communicating the diagnosis to the patients and families.

PO: 4 Should be able to demonstrate empathy and have a human approach towards patients & respect their sensibilities.

PO: 5 Practice the specialty of biochemistry in keeping with the principles of professional ethics.

PO: 6 Demonstrate communication skills of a high order in explaining management and prognosis, providing counselling and giving health education message to patients, families & communities.

PO: 7 Play the assigned role in implementation of national health programs, effectively & responsibly.

PO: 8 Organize and supervise the desired managerial and leadership skills.

PO: 9 Design, fabricate & use indigenous methods/gadgets for experimental purpose

PO: 10 Pursue her / his interest to undergo further specialization

Program Specific Outcomes of MD biochemistry

PSO: 1 Has the competence to perform relevant investigations which will help to diagnose important medical conditions.

PSO: 2 Has acquired skills effectively in interpreting all laboratory reports.

PSO: 3 Perform recent investigations and procedures for patients.

PSO: 4 Demonstrate skills in documentation of reports.

PSO: 5 Is able to organize and equip Biochemistry Lab

PSO: 6 Demonstrate competence in basic concepts of research methodology and epidemiology.

PSO: 7 Develop competency in applying statistical tools in research

PSO: 8 Function as a productive member of a team engaged in health care, research and education.

PSO: 9 Conduct experimental studies analyze and solve clinical and experimental problems

PSO: 10 Develop competency to perform advanced techniques in genetic research

PSO: 11 Develop competency in understanding immunology in health and disease

PSO: 12 Develop competency in explaining the biochemical basis of cancer

PSO: 13 Plan & conduct lecture, practical demonstrations, tutorial classes and small group discussions on clinical problems for undergraduates students of medical and allied disciplines

PSO: 14 Critically review & comment on research papers and give oral presentation.

PSO: 15 Be familiar with literature survey/computer skills.

Course Outcomes of the Elective Course

U19MDBC05 Soft Skills

CO1: Proficiency in research methodology.

CO2: Ability to handle classes.

CO3: Competency in departmental administration

CO4: Ability to present topic in a proper manner in venues such as seminars and CMEs.

CO5: Competency to manage a lab independently

CO6: Organaisational skills - such as for CME programmes.

PAPER I – GENERAL BIOCHEMISTRY AND TECHNIQUES (Course Code: U19MDBC01)

Introductory Biochemistry and Molecular Biochemistry- cell, transport mechanisms, central dogma, gene expression, mutation, molecular techniques

CO1: Describe the structure and functions of cell at molecular level

CO2: Describe central dogma

CO3: Describe regulation of gene expression, mutation and molecular techniques

1. Methods of qualitative analysis of biomolecules :

Principle , experimental procedure and applications of chromatography: Paper, thin layer, ion exchange, affinity, gel filtration, gas- liquid and HPLC. Principle, procedures and application of Electro phoresis: Paper, polyacrylamide gel, agarose gel, and cellulose acetate Ultracentrifugation, Ultrafiltration.

2. Quantitative methods:

Principle and applications of Photometry, spectrophotometry, Fluorometry, ion selective procedures and flame photometry.

3. Principles of Biophysical methods used for analysis of biopolymer structure X-ray diffraction, fluorescence, UV, ORD/CD, visible, NMR and ESR spectroscopy, Hydrodynamic methods, Atomic absorption and plasma emission spectroscopy.

4. Principles and application of light, phase contrast, fluorescence, scanning and transmission electron microscopy, cytophotometry and flow cytometry, fixation and staining.

5. Isotopes :

Detection and measurement of radioactive isotopes. Principles and application of tracer techniques in biology; Radiation desitometry. Application of isotopes in research and clinical biochemistry. Effect of radiation on biological system; Autoradiography, Cerenkov radiation, Liquid Scintillation spectrometry.

6. Concept of pH and buffers. Henderson – Hasselbalch equation and its clinical application. Principle and procedures of determination of pH. Physiological buffers.

7. Diffusion, Osmosis, Osmotic Pressure, Surface tension, Adsorption, Hydrotrophy, viscosity, Colloids. Surface tension and surfactants

8. Amino acids and proteins. Structure and properties of Amino acids, Protein structure and conformation, determination of amino acid Sequence of proteins, chemistry of conjugated proteins, nucleoproteins, lipoproteins, Immunoglobulins, glycoproteins. Structure, functional relationship of proteins: hemoglobin, myoglobin and collagen. Protein - protein interaction. Prions, beta amyloid.

9. Chemistry of carbohydrate:

Monosaccharides, Disaccharides, Homopolysaccharides,

Heteropolysaccharides, Enantiomer, Diastereomer, Mutarotation, Anomer, Epimers.

10. Chemistry of lipids: Classification, Fatty acids, PUFA, Compound lipids, Cholesterol. Triglycerides, Phospholipids, Gangliosides

11. Nucleic acid: Chemistry and structure of bases, Nucleosides, Nucleotides, RNA and DNA. DNA sequence determination. Properties of Nucleic acid. Nucleic acid metabolism and its clinical correlation

12. Bioenergetics and biological oxidation: concept of free energy change, High energy compounds, ATP generation, redox potential, electron transport chain, oxidative phosphorylation, inhibitors, uncouplers, ionophores.

13. Cell fractionation, biochemical activities of different fractions marker enzymes.

14. Enzymes: Classification, nomenclature, enzyme specificity, enzyme kinetics, coenzymes,

cofactors, factors regulating enzyme activity, isozymes, proenzymes, multienzyme complexes, tandem enzymes, covalent modification, Active site of enzymes, methods of locating the amino acids residues in the active site of enzymes. Mechanism of enzyme action.

Enzyme inhibition: competitive, non-competitive, Allosteric and suicidal inhibition.

15. Purification of enzymes from cells, characterization and criterion of purity. Purification of proteins.

16. Membranes: Chemical composition, structure, biological properties, functions, membrane transport systems, ion-channels, endocytosis, exocytosis, defects.

PAPER II INTERMEDIARY METABOLISM (Course Code: U19MDBC02)

U19MDBC02 Biochemistry of body metabolism--metabolism of carbohydrates, aminoacids, lipids, Hb, nucleic acids and their related inborn errors

CO1: Describe the metabolism of carbohydrates and lipids

CO2: Describe the metabolism of protein and Hb

CO3: Describe the metabolism of nucleic acids

CO4: Describe the various inborn errors of metabolism

1. Methods of investigation of metabolic pathways, primary, secondary and tertiary metabolisms.

2. Carbohydrate metabolism: Carbohydrate digestion and absorption. Details of metabolic pathways involving carbohydrates in mammals. Embden-Meyerhof pathway, hexosemonophosphate shunt, gluconeogenesis other minor pathways, fructose and Galactose metabolisms. Inborn errors of metabolism. Blood glucose homeostasis, Hormones influencing carbohydrate utilization -insulin, glucagons, glucocorticoids, epinephrine, and glucose tolerance test, Diabetes Mellitus. Carbohydrate metabolism and brain

3. Amino acid metabolisms: Protein digestion and absorption of amino acid metabolism of individual amino acids, one carbon units, polyamines, nitric oxide, plasma proteins, transport proteins. Inborn errors of metabolism. Types of aminoaciduria and its clinical manifestations.

4. Lipid metabolism: Digestion and absorption, transport and storage, fatty acid synthesis, fatty acid oxidation pathways. Biosynthesis of phospholipids glycolipids. Cholesterol metabolism plasma lipoprotein metabolism. Role of adipose tissue and liver in lipid metabolism. Hormonal regulation of lipid metabolism. Prostaglandins, prostacyclins, leukotriens, thromboxanes and very long chain fatty acids. Inborn errors.

5. Regulation of metabolism: TCA Cycle, integration of metabolisms, common terminal pathway, regulation, amphibolic role. Hormonal regulations of metabolic pathways, Cori's cycle, Alanine cycle, adaptation during starvation. Electron transport chain(ETC) and its clinical and pathological correlation.

6. Purine and Pyrimidine metabolisms: Synthesis and degradation of bases and nucleotides, regulation, gout, Lesch- Nyhan syndrome.

7. Antibiotics and other chemotherapeutic agents-Inhibition of cell-wall synthesis, nucleic acid and protein synthesis, specific enzyme system, Damage to cytoplasmic membrane. Antifungal antibiotics, Anitviral chemotherapeutic agents, Mechanism of action of anticancer drugs. Drug resistance, Assay of antibiotics. Susceptibility to chemotherapeutic agents.

8. Host-microbeinteraction: The process of infection, toxins, Diphtheria toxin, Botulinum toxin, tetanus toxin, Cholera toxin, SLO and SLS, virulence factors.

9. Pituitary and Hypothalamic hormones, Thyroid hormones. Hormones that regulate calcium metabolism, Hormones of adrenal cortex, adrenal medulla, gonads, pancreas and GI.

10. Toxicity studies, Drug assays.

11. Structure & function, Neurochemical basis, Synthesis, storage, release & metabolism of neurotransmitters, Adrenergic and cholinergic systems, pharmacological manipulation of the ANS.

Neurotransmitter: Types, location, function & role in disorders of the CNS, receptors &

Nomenclature, Major diseases of the CNS-Epilepsy, Parkinsonism, Alzheimer's Disease, stroke
MD Biochemistry

and their pharmacotherapy, GABA-sedative & hypnotics, Biological basis of anaesthesia, Pain & analgesia- role of opioids, Biological basis of Psychiatric disorders, CNS depressants-alcohol. CNS stimulants including drug dependence.

12. Biochemistry of muscle contraction.

PAPER III MOLECULAR BIOLOGY AND IMMUNOLOGY (Course Code: U19MDBC03)

U19MDBC03 Biochemistry of tissues- biochemistry of vitamins, enzymes, minerals, hormones, nutrition, TCA cycle, ETC

CO1: Describe the biochemistry of vitamins and minerals

CO2: Describe the biochemistry of enzymes and hormones

CO3: Describe the biochemical basis of nutritional deficiency disorders

CO4: Describe energy metabolism- steps and regulatory mechanisms of TCA cycle and ETC

1. DNA: Replication, DNA damage and repair processes, mutations, amplification of genes, somatic recombination, Telomeres, inhibitors of replication.

2. Fine structure of gene, Eukaryotic genomic organization (structure of chromatin, coding and non coding sequences, satellite DNA)

3. Transcription: Details of transcription. Transcriptional control of gene expression, Operon concept, promoters, enhancers, silencers, hormone responsive elements, transcription factors, post-transcriptional modifications of RNA, exons, introns, splicing, Ribozymes, inhibitors of

MD Biochemistry

transcription.

4. Translation: Genetic code, tRNA, ribosomes, protein biosynthesis, post translational modifications, inhibitors of translation, signal sequences, chaperones and heat shock proteins, anticancer drugs.

5. Lysogeny and lytic cycle of bacteriophages, Bacterial transformation, Host cell restriction, Transduction, complementation. Molecular recombination, DNA ligases, Topoisomerases, Gyrases, Methylases, Nucleases, Restriction endonucleases, plasmids and bacteriophages based vectors for cDNA and genomic libraries.

6. Principles and methods of genetic engineering and gene targeting, Application in health.

7. **Recombinant DNA technique.** Cloning procedures, vectors, plasmids, phages, Cosmids, Restriction map, PCR technique. Southern, Northern, Western blotting procedures. Restriction fragment polymorphism. In -situ hybridization. Genomic library and cDNA library, Mutations, mutagens, carcinogens, in-vitro mutagenesis. Transgenic animals and micro injection technique. Genetherapy. Protein degradation. Cathepsins, proteosomes, Caspases, Apoptosis.

8. **Biochemistry and molecular biology of cancer**, oncogenes, Chemical carcinogenesis, Genetic and metabolic disorders, Hormonal imbalances, Drug metabolism and detoxification. Genetic load and genetic counseling.

9. Basic concepts of immunology: Chemistry of immunoglobulins, primary and secondary immune responses, auto immune responses, auto immune phenomenon, Anaphylaxis, clonal selection, B cells, T cells, helper T cells, NK cells, macrophages, Interleukins, cytokines, HLA antigens, monoclonal antibodies, Hybridoma technology, Immunodiffusion, Immuno electrophoresis, radio immuno assay (RIA), enzyme linked immunosorbent assay (ELISA), Fluorescent in situ hybridization (FISH) techniques.

10. Humoral and cell mediated immunity, MHC Mechanism of immune response and generation of immunological diversity, Genetic Control immune response. Effector mechanism.

11. Hypersensitivity reactions, Delayed type hypersensitivity: T-cell mediated immunity
Autoimmunity, Transfusion immunology, Transplantation immunology.

12. Allergy & inflammation: Histamine, 5HT, Prostaglandins, PAF, Bradykinin, Adenosine- role
in allergy & inflammation, pharmacological manipulation, Non-steroidal anti-inflammatory
drugs, Pathogenesis of asthma & principles of therapy.

**PAPER IV–CLINICAL BIOCHEMISTRY AND NUTRITION(Course Code:
U19MDBC04)**

**U19MDBC04 Practical and recent advances in Biochemistry-routine blood chemistry,
LFT,RFT, PFT, analysis of body fluids, special tests-ELISA, Chemiluminence techniques,
immunoflurimetry, biosensors, biochemistry and immunolgy of cancer, AIDS, organ
transplantation, Gene therapy Biostatistics and biomedical instrumentation, cytogenetics,**

CO1: Perform routine biochemical investigations like LFT, RFT, TFT

CO2: Perform specialised biochemical investigations like ELISA,Chemiluminence
techniques,immunoflurimetry,biosensors

CO3: Describe the biochemistry and immunology of cancer,AIDS and organ
transplantation

CO4: Describe Gene therapy and cytogenetics

CO5: Apply biostatistical tools in medical research

1. Vitamins: Fat soluble and water soluble vitamins, chemistry, absorption, metabolism,
biochemical roles, requirement, deficiency manifestations.

2 Mineral metabolism: Macrominerals, sodium, potassium chloride, magnesium, calcium,
phosphorus.

Trace elements: iron, copper, manganese, zinc, cobalt, molybdenum, selenium, iodine and
fluoride.

3. Nutritional requirements: Energy requirements, balanced diet, nutritional disorders, obesity, starvation, PUFA, dietary fibres, Cholesterol.
4. Protein requirements: Nitrogen balance, nutritive value, biological value, chemical score, protein energy malnutrition, Kwashiorkor and Marasmus.
5. Endocrinology: Mechanism of action of hormones, hormone receptors, signal transduction, G-proteins, second messengers, cyclic AMP, cyclic GMP, calcium, inositol triphosphate, diacyl glycerol, nitric oxide, Biosynthesis of adrenal and thyroid hormones, metabolic regulation by hormones, hormonal regulation of gene expression , hormonal disorders, biochemical investigation of endocrine disorders, thyroid and adrenal function tests.
6. Erythrocytes: Chemical make up, metabolic pathways, haemoglobin, hemoglobinopathies, porphyrias, heme synthesis and degradation, bilirubin - metabolism, jaundice, laboratory findings in jaundices. Composition of blood plasma in health and diseases, normal values.
7. Acid base balance , water balance and electrolyte balance, related disorders.
- 8. Clinical Pharmacokinetics, Clinical Trials, Adverse drug reactions including interactions, pharmacoepidemiology, pharmacogenetics.**
9. Pathogenesis of hypertension, angina pectoris, myocardial infarction, congestive cardiac failure, cardiac arrhythmias, shock and hyperlipidaemias, Principles of their pharmacotherapy, Diuretics.
10. Principles of use of anticoagulants, antiplatelet drugs, fibrinolytic agents and drugs for treatment of anaemia.
11. Biochemical investigation of liver, kidney and gastric functions, Malabsorption disorders, inherited metabolic disorders.
12. Cell biology: Cell cycle, check points, regulation, Oncogenes, tumour suppressor genes, tumour markers.

13. Reactive oxygen species and defence mechanisms, antioxidants, and enzyme systems.
14. Diagnostic enzymology: LDH, CPK, AST, ALT, ALP, ACP, GGT, Amylase, 5' nucleotidase, etc.
15. Acute phase proteins: Alpha-1, anti-trypsin, Alpha-2, macroglobulin, Haptoglobin, Ceruloplasmin etc.
16. Tumor markers
17. AIDS; HIV, genes and gene products, diagnosis, precautions. Alzheimer's disease, Prions, beta amyloid.
18. Laboratory management: Precision, accuracy, specificity, sensitivity, percentage error, quality control, precautions in handling hazardous materials pre-analytical variations.

SOFT SKILLS (Course Code:U19MDBC05)

- 1: Proficiency in research methodology.
- 2: Ability to handle classes.
- 3: Competency in departmental administration
- 4: Ability to present topic in a proper manner in venues such as seminars and CMEs.
- 5: Competency to manage a lab independently
- 6: Organisational skills - such as for CME programmes.

Practical syllabus

MD BIOCHEMISTRY)

PAPER I – Biomedical Techniques, Biomolecules and Statistics

GENERAL

Preparation of reagents
Standardization of methods
Preparation of buffers
General care and maintenance of equipment and glassware
Precautions and handling laboratory hazards
Familiarity with equipment: microbalance, pH meter, spectrophotometer, fluorimeter, centrifuges, incubators, freezers, fraction collectors, electrophoresis, homogenizer etc.
Paper chromatography of amino acids.
Thin layer chromatography of amino acids.
Thin layer chromatography of carbohydrates.
Ion exchange chromatography
Gel filtration chromatography (Sephadex) of proteins, molecular weight determination.
Affinity chromatography, Blue Sepharose and albumin.
Demonstration of HPLC
Paper electrophoresis, Agarose gel
Electrophoresis of serum proteins
Polyacrylamide gel electrophoresis, molecular weight determination.
Amylase, effect of substrate, pH and chloride.
Trypsin or chymotrypsin, caseinolytic method, effect of pH, effect of temperature, and K_m value.
Study of proteinase inhibitor.
Enzyme purification: Amylase or Urease.
Assay of enzyme, K_m value
Cell fractionation
Estimation of amino acid, Ninhydrin (colorimetric) method.
Protein estimation by Lowry's method.
Estimation of proteins by Folin's method
Estimation of protein by dye binding method.
Estimation of nitrogen content of protein by Kjeldahl method.
Titration of amino acid, formol titration and pK values.
Absorption spectra of Phenylalanine, Tyrosine and Tryptophan.

Absorption spectra of Purines and pyrimidines.

Estimation of total sugars, by Phenol- sulfuric acid method.

Estimation of reducing sugars – Arsenomolybdate method.

Estimation of ketohexoses (fructose) – Resorcinol method.

Estimation of Aldohexoses (glucose) – Iodometric method.

Periodate oxidation of sugars.

Estimation of amino sugars.

Graphical representation of data, correlation and regression analysis, students “t” test, “chi-square’ test, analysis of variance.

PAPER II - INTERMEDIARY METABOLISM

Estimation of glucose by Glucose oxidase method.

Estimation of glucose by ortho toluidine method.

Estimation of glucose by Nelson-Somogyi method.

Glucose tolerance test

Blood urea estimation

Blood creatinine estimation

Serum creatinine.

Cholesterol and HDL cholesterol, Abell’s and Ferric chloride methods.

Flame photometry, Sodium and Potassium.

Lipid profile

Plasma chloride, bicarbonate, pH and pCO₂.

CSF analysis, protein, sugar and chloride.

TC, DC, ESR, Hb, BT, CT, Prothrombin time

Inborn errors of metabolism, urine screening

PAPER III – Molecular Biology, Applied Genetics, and Immunology

Isolation of DNA from animal tissue, check its purity by 260/280 nm absorption.

Isolation of plasmid / bacteriophage DNA.
Restriction digestion and agarose gel electrophoresis.
Southern blotting.
Isolation of mitochondria from animal tissue.
Isolation of RNA
Estimation of succinate dehydrogenase activity.
Study of mitosis, karyotyping
Ame's test
Immunodiffusion
Radial immunodiffusion.
Hemagglutination
Latex agglutination
Widal test
Complement fixation test
Immunoelectrophoresis.
ELISA: Tumor markers, T3, T4, TSH.
Radio immuno assay
Lymphocyte culture
Purification of IgG from human sere.
Raise anti IgG and purify it.
Conjugation with ALP or HRP.
FITC conjugation of antibody
Western blotting.
Blood grouping and cross matching
C reactive protein, haptoglobins, ceruloplasmin
Diagnosis of HIV

PAPER IV - CLNICAL BIOCHEMISTRY AND NUTRITION

Specimen collection, handling and storage.

Estimation of Albumin, total proteins and Albumin globulin ratio in serum. Biuret and dye binding method.

Serum calcium estimation.

Serum bilirubin estimation.

Serum Alkaline phosphatase.

Serum Acid phosphatase.

SGOT (AST).

SGPT (ALT).

Total LDL and iso-enzymes.

Serum amylase, Somogyi method.

Serum iron and iron binding capacity.

Electrophoresis, Lipoproteins and serum proteins

Electrophoresis, normal and abnormal hemoglobins.

Glycated hemoglobin, by affinity chromatography.

Serum triglycerides, enzymatic.

Creatinine clearance.

Urea clearance.

Protein estimation in urine and microproteinuria.

Serum GGT.

Serum lipase.

Serum inorganic phosphorus.

Estimation of Vitamin C, titration, and colorimetric method.

Estimation of iron, transferring

Estimation of T3, T4, TSH, thyroglobulin

Estimation of cortisol, VMA

Physical and chemical analysis of urine, pH, specific gravity, reducing substances, protein, ketone bodies, blood, bile salts, bile pigments

Urinary aminogram

Urine urea, creatine, creatinine, uric acid, calcium, phosphorus

Autoanalyser (demonstration).

Quality control, internal and external, analysis of variance



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD COMMUNITY MEDICINE

Preamble

M.D in Community Medicine is a Professional degree conferred in recognition of a candidate's command of a comprehensive body of knowledge in the field of public health, medical education and related disciplines. The focus of this degree is the development of knowledge, skills and aptitude in the areas of professional leadership and application of existing State-of-the-art knowledge and approaches to medical education and public health. It shall provide a comprehensive approach to public health issues in general and to Community Medicine in particular with special stress to medical education, research and service in the community settings.

Outcomes

Program Outcomes

- PO1: Capability to function as a specialist in Community Medicine and Public Health
- PO2: Competency to hold high academic / managerial / or administrative positions in health systems in India and abroad.
- PO3: The competency to provide consultancy services to National or International Organization on Public Health issues.
- PO4: The ability to scientifically plan, execute and evaluate ongoing Public Health Programmes and Medical Education System.

Program Specific Outcomes

- PSO1: Ability to identify important public health problems and approaches to solve them
- PSO1: Ability to practice modern techniques in epidemiology and research
- PSO3: The ability to apply management techniques in health
- PSO4. Ability to effectively communicate at individual, family and community using modern tools and techniques
- PSO5: Competency to function as an effective health team leader and trainer
- PSO6: Ability to apply the clinical skills to recognize and manage common health problems including their physical, emotional, social and economic aspects at the individual and family levels.
- PSO7: Ability to manage / deal with medical emergencies at the community level.
- PSO8: Ability to identify and manage the health problems of the community he / she serves.
- PSO9: Ability to organize health care in disasters and calamities including rehabilitation services.
- PSO10: Ability to organize health care services for special groups like mothers, infants, under fives, school children, adolescent, handicapped children, geriatric and terminally ill.
- PSO11: Ability to identify the health needs and demands of the community and prioritise the most important problems and help formulate and implement a plan of action and to manage them under National Health Programme guidelines.
- PSO12: The ability to use effectively tools of epidemiology for understanding disease causation and determinants
- PSO13: The ability to effectively communicate findings of the study to the experts and public.

PSO14: Knowledge of medical ethics and etiquette.

PSO15: Skills necessary computer skills to carry out the above work.

PSO16: The ability to work as an effective member of the health team and as a team leader

PSO17: The competency to be an effective teacher and trainer of community medicine.

Specific learning objectives

At the end of the course, the candidate should be able to function / as Community Physicians / Primary Care Physicians and should be able

1. To identify important public health problems and approaches to solve them
2. To identify and practice modern techniques in epidemiology and research
3. To identify and apply management techniques in health
4. To identify and practice communication skills at individual, family and community using modern tools and techniques
5. To be competent to function as an effective health team leader and trainer

Skill Development

1. Able to apply the clinical skills to recognize and manage common health problems including their physical, emotional, social and economic aspects at the individual and family levels.

1.1 Able to manage / deal with medical emergencies at the community level.

1.2 Able to identify, plan and manage the health problems of the community he / she serves.

1.3 Able to organize health care of disasters and calamities including rehabilitation services.

1.4 Able to organize health care services for special groups like mothers, infants, under fives, school children, adolescent, handicapped children, geriatric and terminally ill.

1.5 To identify the health needs and demands of the community and prioritise the most important problems and help formulate and implement a plan of action and to manage them under National Health Programme guidelines.

2. Aware of the national priorities and the goals to be achieved to implement primary health care.

2.1 Organise epidemiological research studies and should be able to design a study, collect data, analyze it with appropriate statistical technique and make a report.

2.2. Use effectively tools of epidemiology for understanding disease causation and determinants

2.3. Conduct epidemiological investigation of communicable and no communicable diseases and other health problems and suggest appropriate solutions.

2.4. To identify and formulate research questions and design and implement epidemiological and health system research studies.

2.5. To effectively communicate findings of the study to the experts and public.

2.6. Apply ethical principles in research

2.7. To prepare and present scientific papers

2.8. To acquire necessary computer skills to carry out the above work.

3.1 Aware of the health care delivery system and aware of the national priorities and goals to be achieved to implement public health care.

3.2 Manage health information system and respond timely to the information obtained.

3.3 Assess and find out economic need and identification of public health programmes.

3.4 Initiate, implement and supervise national health programmes

3.5 Implementation of public health laws

3.6 Plan human resources development

3.7 Manage logistics and materials effectively

3.8 Monitor and assure quality in programme implementation

4

4.1. Able to plan and implement health education programmes

4.2 Able to promote community participation in implementation of national health programmes.

4.3. Interact, communicate and educate effectively persons from diverse backgrounds to promote healthy behaviour through community participation

5.

5.1. To work as an effective member of the health team and as a team leader

- 5.2. Able to act as an effective teacher and trainer of community medicine
- 5.3. Able to assess the learning needs of any given group
- 5.4. Formulate learning objectives
- 5.5. To plan curriculum and prepare curriculum material
- 5.6. To implement appropriate teaching methods and to evaluate learning experience
- 5.7. To develop pedagogic skills to handle undergraduates and orientation sessions for health functionaries at different levels.

COURSE CONTENT

Paper I

Epidemiology including Biostatistics, Concepts of Communicable Diseases and Non communicable Diseases, Environmental health and Medical sociology

Epidemiology

- History of Epidemiology
- Concepts in Epidemiology
- Introduction to Descriptive and Analytical Epidemiology
- Quantitative Epidemiologic Methods
- Epidemiology of outbreaks / investigations
- Epidemiologic Surveillance
- Epidemiological studies
- Qualities of epidemiological tests
- Outcome measurement in health care
- Sensitivity and specificity
- Introduction to Geographic Information Systems
- Health mapping
- Disease mapping
- Record linkage
- Biomarkers
- Registries

Bio-statistics

- Research methodology
- Survey methodology
- Designing a research study
- Preparation of research protocol
- Determining sample size
- Research methods in social and behavioural sciences
- Sampling method
- Sampling and different types of sampling technique
- Introduction to Biostatistics

- Basic concepts of statistical reasoning, data description, descriptive statistics, probability concepts
- Tests of significance
- Estimation, confidence intervals, hypothesis testing, different tests of significance and the situation of their application – concept of standard error, chi-square, Z test, T test, correlation coefficient, linear regression, analysis of variance procedures, nonparametric methods, multivariate techniques, survival analysis and operational research – health service research.
- Introduction to statistical computing
- Introduction to statistical packages
- Computer skills

Communicable and Non-communicable diseases

- Concepts – epidemiology, prevention & control

Environmental Health

- Principles of Environmental Health and Human Ecology
- Environment health risks and their impact
- Environmental pollution
- Waste disposal
- Housing sanitation and standards
- Environmental Policy Programmes and Legislations
- Medical Entomology including vector and rodent control
- Current and emerging issues in environmental health

Occupational Health

- Health problems and their prevention and control
- Legislation related to health, safety and welfare of workers
- Organisation and administration of occupational health services,
- Industrial hygiene
- Recent advances

Medical Sociology & Psychosocial issues

- Cultural, socio economic and psychological determinants and their impact on health
- Knowledge, attitude and practice related to public health problems
- Clinico social case study in the family and community
- Impact of urbanization on health
- Doctor-patient relationship and hospital sociology
- Changes in lifestyle and health
- Common mental health issues and prevention

Paper II

Reproduction and Child Health Issues including Public Health Nutrition

- Reproduction and child health issues – relevance
- Policy and Programmes in Reproductive Child Health
- Reproductive Child Health package and interventions
- Women empowerment and gender related issues
- Newer initiatives in Reproductive Child Health
- Management of reproduction including sterility and birth regulation
- MTP, prenatal determination of sex
- School health
- Adolescent health
- Health problems, services and programmes for the priority groups – Geriatrics, Tribal
- Diet and life style issues

Public Health Nutrition

- Nutritional problems of the country; Role of nutrition in Health and Disease.
- Common sources of various nutrients and special nutritional requirement according to age, sex, activity, physiological conditions.
- Nutritional assessment of individual, families and the community by selecting and using appropriate methods such as : anthropometry, clinical, dietary, laboratory techniques
- Compare recommended allowances of individual and families with actual intake.
- Plan and recommend a suitable diet for the individuals and families bearing in mind local availability of foods, economic status and therapeutic diets.
- Common nutritional disorders: protein energy malnutrition
- National Nutritional Policy
- National programmes in nutrition and their evaluation
- Food hygiene, food adulteration, legislation to control adulteration

Paper III

Primary Health Care and Health System Management

- Rural sanitation
- Health legislations
- Health care system in India
- Health care delivery system in developed countries
- Socialized medicine
- Health insurance
- Urban Health Services in India
- Primary Health Care Initiative
- Health Promotion Initiatives
- Programme evaluation
- Cost benefit and cost effectiveness
- Quality of health care
- Health care versus medical care
- Role of NGOs in health care of the community
- Spiraling cost of medical care
- Public Health Program Planning and Evaluation
- Public Health Leadership

- Medical Anthropology
- Health and Public Health Law
- Health Economics
- Finance for Health Management
- Health Information Systems
- Technology assessment and economic evaluation of health programmes
- Health Care Management System
- Principles of inspection and supervision
- Modern concepts in health care management
- Total quality management
- Healthcare marketing
- Leadership in public health
- Community Based public health programmes
- Public health funding
- Management information systems
- Cost analysis and Cost effectiveness
- National Health Policy
- Health Planning in India
- National Rural Health Mission and National Urban Health Mission
- National Health Program
- Rural development
- Five year plans

Health Education (Information, Education, Communication)

- Effective communication with individuals, family and community using tools and techniques of information, education, communication.
- Principles of communication and barriers to effective communication
- Principles, methods and evaluation of health education
- Methods of health education with their advantages and disadvantages
- Use of appropriate media (simple audiovisual aids) for effective health education

Paper IV

Global Health Initiative and Health Technology

- Emerging health issues of national and international concern
- Disaster management
- Social and behavioral aspects of global health
- Ethical issues in public health
- Health policy and politics
- Behavioral and social aspects of public health
- Epidemiology of bioterrorism / catastrophic events
- Health promotion in Multicultural populations
- Public health laws – national and international
- International health organizations
- World health organization
- Public health issues facing developing countries
- Concept of global health and global community
- Remote sensing, GIS and other new technologies

Class and field training

1. Self directed – At least twice a week in which the trainee will present articles, abstracts from journals, seminars, group work, epidemiological and statistical exercises, case studies and family study presentation.
2. Facilitating learning of undergraduates (Interactive session)
3. Participation in scientific programmes

1st year – Interactive sessions, Seminars, Journal Clubs, Practical sessions in entomology, Parasitology, Biostatistics and Epidemiology.
Selection of thesis topic
Thesis Registration and thesis work
Undergraduate teaching
Other services – Camps, Clinics, investigation of epidemics, Natural disaster management, Health Programme Evaluation, Training in computer application

2nd year – Posting to different departments

A. Field and Laboratory Posting

1. PHC / CHC 2 months – 8 weeks
2. District Health Administration – 1 week
3. Urban – 2 weeks
4. District TB Control – 1 week
5. Local bodies in health, NGO's and private agencies – 1 week

B. Medical specialties

1. Obstetrics and Gynaecology – 2 weeks
2. Child health – 4 weeks
3. General Medicine – 2 weeks
4. Psychiatry – 2 weeks
5. Ophthalmology – 2 weeks
6. Dermatology – 2 weeks
7. Infectious diseases – 2 weeks
8. Physical Medicine and Rehabilitation – 1 week
9. Community Dentistry – 1 week
10. Community Oncology – 1 week
11. Occupational Health – 1 week
12. Microbiology practicals – 2 weeks
13. Government Analyst and Public Health Lab – 1 week
14. Respiratory Medicine – 1 week
15. Geriatrics – 2 weeks
16. Pain and Palliative – 1 week
17. Family planning – 2 weeks
18. Surgery – 2 weeks
19. Anesthesia - 2 weeks

20. Casualty – 2 weeks

3rd year –

Posting to PHC / CHC – 4 weeks

UHC – 2 weeks

Interactive sessions, Seminars, Journal Clubs,

Other services – Camps, Clinics, investigation of epidemics, Natural disaster management, Health Programme Evaluation

**Thesis Completion and submission 6 months before University Examination
Log Book**

Each trainee shall maintain a log book in which the daily work is documented. This will be signed by the faculty guide concerned and submitted to the HOD every Saturday for concurrent evaluation which shall include, but not limited to, punctuality, regularity, sincerity, aptitude, dedication, innovation, commitment and participation in MBBS training programmes, interaction / discussion skills, initiatives and willingness to take up responsibilities etc. HOD shall discuss with the guide concerned and document it in the concurrent assessment form. Necessary feedback shall be given to the trainees.

Examination pattern

Written exam will consist of 4 theory papers each of 3 hours duration, carrying 100 marks each.

Paper I – Epidemiology including Biostatistics, Concepts of Communicable diseases and noncommunicable diseases, Environmental health and Medical sociology

Paper II – Reproduction and child health issues including Public Health Nutrition

Paper III – Health System Management and Health Education

Paper IV – Global Health Issues and Health Technology

Practical and Viva

Day : 1

Practical 1

Clinico social study and discussion – **2 Hrs - 30 marks**

Identification of health problems in the community – 2 short cases – **1 Hr – 2 x 10 = 20 marks**

Practical 2

Microbiology practical

Identification of spotters, vectors and parasites – **30 minutes = 15 marks**

Practical 3

Exercise in Nutrition / Water sample analysis / Interpretation of data reports and discussion –
1 Hr – 15 marks

Practical 4

Epidemiology exercise

Statistics exercise -

1 Hr - 2 x 10 = 20 marks

Day 2

Pedagogy

Thesis discussion-

- 1 Hr for each candidate – 50 marks

Viva Voce

1 Hr / candidate – 50 marks

- 1 Hr / candidate – 100 marks

*** Thesis to be accepted for eligibility for the exam**

Total marks for practical & viva voce– 300

Practical – 100

Pedagogy – 50

Thesis Defence – 50

Viva voce – 100

U19MDCM01 Paper - I Epidemiology Including Biostatistics, Concepts of Communicable Diseases and Non Communicable Diseases, Environmental Health and Medical Sociology

CO1: Ability to identify and investigate an Outbreak.

CO2: Ability to describe the natural history, aetiology and risk factors of a disease.

CO3: Competency to conduct an epidemiological study, including population studies.

CO4: Knowledge about prevention and control of communicable and Non-communicable diseases.

CO5: The ability to identify cultural, socio-economic and psychological determinants of

diseases.CO6: The ability to apply the principles of biostatistics in collecting, compiling and analyzing epidemiological data.

Epidemiology

- **History of Epidemiology**
- **Concepts in Epidemiology**
- **Introduction to Descriptive and Analytical Epidemiology**
- **Quantitative Epidemiologic Methods**
- Epidemiology of outbreaks / investigations
- Epidemiologic Surveillance
- Epidemiological studies
- Qualities of epidemiological tests
- Outcome measurement in health care
- Sensitivity and specificity
- Introduction to Geographic Information Systems
- Health mapping
- Disease mapping
- Record linkage
- Biomarkers
- Registries

Bio-statistics

- **Research methodology**
- **Survey methodology**
- **Designing a research study**
- **Preparation of research protocol**
- **Determining sample size**
- **Research methods in social and behavioural sciences**

- **Sampling method**
 - **Sampling and different types of sampling technique**
 - Introduction to Biostatistics
 - Basic concepts of statistical reasoning, data description, descriptive statistics, probability concepts
 - Tests of significance
 - Estimation, confidence intervals, hypothesis testing, different tests of significance and the situation of their application – concept of standard error, chi-square, Z test, T test, correlation coefficient, linear regression, analysis of variance procedures, nonparametric methods, multivariate techniques, survival analysis and operational research – health service research.
 - Introduction to statistical computing
 - Introduction to statistical packages
 - Computer skills
- Communicable and Non-communicable diseases**
- **Concepts – epidemiology, prevention & control**

Environmental Health

- **Principles of Environmental Health and Human Ecology**
- **Environment health risks and their impact**
- **Environmental pollution**
- **Waste disposal**
- Housing sanitation and standards
- Environmental Policy Programmes and Legislations
- Medical Entomology including vector and rodent control
- Current and emerging issues in environmental health

Occupational Health

- **Health problems and their prevention and control**
- **Legislation related to health, safety and welfare of workers**
- Organisation and administration of occupational health services,
- Industrial hygiene
- Recent advances

Medical Sociology & Psychosocial issues

- **Cultural, socio economic and psychological determinants and their impact on health**
- Knowledge, attitude and practice related to public health problems
- Clinico social case study in the family and community
- Impact of urbanization on health
- Doctor-patient relationship and hospital sociology
- Changes in lifestyle and health
- Common mental health issues and prevention

U19MDCM02 Paper - II Reproduction and Child Health Including Public Health Nutrition

CO1: Ability to identify and manage reproductive and child health issues.

CO2: Knowledge of demography and the ability to apply the same in population studies.

CO3: Awareness of gender related issues and women empowerment in the community and its applications.

CO4: Competency to effectively implement school health programmes.

CO5: Ability to manage the nutritional problems in the community.

Reproduction and Child Health Issues including Public Health Nutrition

- **Reproduction and child health issues – relevance**
- **Policy and Programmes in Reproductive Child Health**
- **Reproductive Child Health package and interventions**
- **Women empowerment and gender related issues**
- Newer initiatives in Reproductive Child Health
- Steps to reduce anemia in adolescent girls
- Management of reproduction including sterility and birth regulation
- MTP, prenatal determination of sex
- School health
- Adolescent health
- Health education classes
- Health problems, services and programmes for the priority groups – Geriatrics, Tribal
- Minority support groups
- Diet and life style issues

Public Health Nutrition

- **Nutritional problems of the country; Role of nutrition in Health and Disease.**
- **Common sources of various nutrients and special nutritional requirement according to age, sex, activity, physiological conditions.**
- **Nutritional assessment of individual, families and the community by selecting and using appropriate methods such as : anthropometry, clinical, dietary, laboratory techniques**
- **Compare recommended allowances of individual and families with actual intake.**
- Plan and recommend a suitable diet for the individuals and families bearing in mind local availability of foods, economic status and therapeutic diets.
- Common nutritional disorders: protein energy malnutrition
- National Nutritional Policy
- National programmes in nutrition and their evaluation
- Food hygiene, food adulteration, legislation to control adulteration

U19MDCM03 Paper - III Primary Health Care and Health System Management

CO1: The competency to plan and implement primary health care delivery for the community.

CO2: The ability to implement health promotion strategies.

CO3: The ability to provide comprehensive - promotive, preventive, curative and rehabilitative health services.

CO4: The ability to monitor and evaluate health programmes in the community.

CO5: The ability to apply the principles of management in health care delivery systems.

Primary Health Care and Health System Management

- **Rural sanitation**
- **Health legislations**
- **Health care system in India**
- **Health care delivery system in developed countries**
- **Socialized medicine**
- **Health insurance**
- **Urban Health Services in India**
- Primary Health Care Initiative
- Health Promotion Initiatives
- Programme evaluation
- Cost benefit and cost effectiveness
- Quality of health care
- Health care versus medical care
- Role of NGOs in health care of the community
- Spiraling cost of medical care
- Public Health Program Planning and Evaluation
- Public Health Leadership
- Medical Anthropology
- Health and Public Health Law
- Health Economics
- Finance for Health Management
- Health Information Systems
- Management of an outbreak
- Technology assessment and economic evaluation of health programmes
- Health Care Management System
- Principles of inspection and supervision
- Promotion of vaccination according to the national schedule in pediatric age group
- Modern concepts in health care management
- Total quality management
- Health care marketing
- Leadership in public health
- Community Based public health programmes
- Public health funding
- Management information systems
- Cost analysis and Cost effectiveness
- National Health Policy
- Health Planning in India
- Waste management
- National Rural Health Mission and National Urban Health Mission
- National Health Program
- Rural development
- Five year plans

Health Education (Information, Education, Communication)

- **Effective communication with individuals, family and community using tools and techniques of information, education, communication.**
- **Principles of communication and barriers to effective communication**
- **Principles, methods and evaluation of health education**

- Methods of health education with their advantages and disadvantages
- Use of appropriate media (simple audiovisual aids) for effective health education

U19MDCM04 Paper - IV Global Health Initiative and Health Technology

CO1: The competency to prepare and implement health care in disasters.

CO2: The ability to give inputs in formulation and implementation of public health laws.

CO3: The ability to apply the principles of epidemiology in health policy development.

CO4: The ability to apply the principles of to effectively deal with cross border health challenges.

CO5: The competency to use technology in providing healthcare to populations including hard to reach communities.

Global Health Initiative and Health Technology

- **Emerging health issues of national and international concern**
- **Disaster management**
- **Social and behavioral aspects of global health**
- **Ethical issues in public health**
- **Health policy and politics**
- **Behavioral and social aspects of public health**
- Epidemiology of bioterrorism / catastrophic events
- Health promotion in Multicultural populations
- Public health laws – national and international
- International health organizations
- World health organization
- Public health issues facing developing countries
- Concept of global health and global community
- Remote sensing, GIS and other new technologies

U19MDCM05 Soft Skills (Elective Course)

CO1: Ability to use Computers for Teaching and Research purposes.

CO2: Ability to work as a member of a team.

CO3: Competency to communicate with a large group of people in a community setting.

CO4: Teaching skills.

CO5: Ability to work as the leader of a healthcare team.

MD – (Community Medicine) Degree Examination

Paper I: Epidemiology including Biostatistics, Concepts of Communicable Diseases and Non communicable Diseases, Environmental health and Medical sociology

*Instruction :Answer **all** questions*

Time :3 hrs

Max marks –100

1. Discuss the strategies for Polio eradication in the country. Critically evaluate the implementation of the programme (20 marks)

2. **Comment on :** (4 x 10 = 40 marks)

- a. Disease Registries
- b. Community Diagnosis
- c. Nested case control study
- d. Total sanitation campaign

3. **Write briefly on:** (4 x 10 = 40 marks)

- a. Social marketing
- b. Latent infection
- c. Non parametric methods in statistics
- d. TB control – a shared responsibility

Paper II : Reproduction and Child Health including Public Health Nutrition

*Instruction :Answer **all** questions*

Time :3 hrs

Max marks –100

1. Discuss the components of the Reproductive and Child Health Package in RCH – II.

Give and brief account of IMNCI strategy under RCH II (20 marks)

2. **Comment on:** (4 x 10 = 40 marks)

- a. Need for diet modification in life style diseases
- b. Relevance of Geriatric Care in health service system
- c. Rationale of supplementary Nutrition Programmes
- d. Prenatal Sex Determination

3. **Write briefly on:** (4 x 10 = 40 marks)

- a. Community Need Assessment Approach
- b. Newer contraceptives
- c. Salient features of Urban Health Mission
- d. Public Health importance of Iodine Deficiency Disorder

MD – (Community Medicine) Degree Examination

Paper III: Primary Health Care & Health System Management

*Instruction :Answer **all** questions*

Time :3 hrs

Max marks –100

1. Discuss the origin and concept of Social Security. Critically evaluate the implementation of Social Security Legislations in India (20 marks)

2. **Comment on:** (4 x 10 = 40 marks)

- a. Current Infant Immunization Schedule
- b. Financing in health system
- c. Mass Drug Administration Strategy
- d. Role of intersectoral co-ordination in Health

3. **Write briefly on:** (4 x 10 = 40 marks)

- a. Evaluation of quality of health care
- b. Health Survey and Development Committee report
- c. Education Vs Legislation in Public Health
- d. Socialized Medicine

MD – (Community Medicine) Degree Examination

Paper IV: Global Health Initiative and Health Technology

*Instruction :Answer **all** questions*

Time :3 hrs

Max marks –100

1. Give an account of the emerging health issues. Discuss their impact on the health system and outline the strategies for the control of these issues.

(20 marks)

2. **Comment on:**

(4 x10 =40marks)

- a. Ethical issues in Public Health
- b. Epidemiological transition
- c. Bio-terrorism
- d. Tobacco free initiative

3. **Write briefly on:**

(4 x10 =40marks)

- a. BCC strategies
- b. Remote sensing technology
- c. Health tourism and its impact on public health
- d. AIDS vaccine

Journals

1. Lancet
2. Indian Journal of Community Medicine
3. Indian Journal of Public Health
4. American Journal of Public Health
5. British Medical Journal
6. WHO Bulletin
7. WHO TRS

8. Indian Journal of Medical Research
9. Journal of Clinical Epidemiology
10. Journal of Communicable Diseases
11. Journal of Clinical Nutrition
12. Indian Journal of Paediatrics
13. World Health Forum

Text Books

Sl No:	Author / Editor	Title of the books	Edition	Publishers
1	Mancy & Rosenau	Public Health & Preventive Medicine	12 th	Appleton- Century Crafts or Oxford University Press
2	Walter W Holland	The Oxford Text Book of Public Health Voll,II,III,IV	1985 Edn	Oxford University Press Walton St.Oxford 8x2, 6 D.D.U.K
3	Hanlon & Pickett	Public Health Administration & Practice	1983 Edn	B.T. Publication Pvt. Ltd
4	Garrow & James	Human Nutrition & Dietetics		
5	Hobson	The theory & practice of public health		
6	DJP Barker, G. Rose	Epidemiology in Medical Practice		
7	Wilcocks & Mansion Bahn	Manson's Tropical Disease		
8	Bradford Hill	Text book of Biostatistics		
9	Topley Wilson	Microbiology of microbial infections		

10	Panicker	Text book of Micorbiology		
11	Leavell H.R & Clark. E. G	Preventive Medicine	1965 (latest edn)	Ms.graw Hill, New york
12	Last John. M	Dictionary of Epidemiology	1995	Oxford University Press
13	Susser M.W & Watson.W	Sociology in Medicine	1971 (latest edn)	Oxford University Press
14	Mausner.J.S & Kramer.S	Mausner and Bahn: Epidemiology – An introductory text	1985 latest edn	Saunders
15	Mac Mohan .B & Pugh	Epidemiology – principles and methods		Boston: Little, Brown
16	Anderson & Langton	Health Principles and Practice	1961	C.V. Mosley
17	Hunter	Hunter's Disease of Occupational health		
18	Park	Tex book of Preventive and Social Medicine	18 th edition	
19	Chatterjee. K. D	Human parasites and parasitic disease		
20	Swaminathan M	Human Nutrition &Diet		

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**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD DERMATOLOGY

(Revised with effect from 2019-2020 onwards)

Goal

To provide uniform, standard training in Dermatology, Venereology and Leprosy to the candidates so that after 3 years of training they are able to acquire the necessary competence in the speciality to work as Senior Resident/ Junior Consultant

Objectives to be achieved by an individual at the end of 3 years of training

The students after the training should be able to:

- Provide quality patient's Care -Diagnosis, Treatment and handle emergencies related to Skin, Venereal diseases and Leprosy
- Describe preventive measures at individual and community levels against communicable Skin, Leprosy and Venereal diseases
- Teach the medical and Paramedical students in the specialities
- Conduct research in the field of Skin, Venereal diseases & Leprosy
- Do the clinical examination of the patient (including approach to the patient, history taking, knowledge about basic skin lesions, proper dermatological and systemic examination and familiarity with the elicitation of important clinical signs and tests such as Auspitz, Nikolsky, Darier sign, dermatographism, diascopy, Grattage test, proper evaluation of cutaneous sensation etc).
- Carryout the laboratory investigations related to the diseases of Skin, STD and Leprosy, such as-Scrapings of skin, nails and hair for fungus and ecto parasites, Slit smear examination, Cytopathological Examination, Tzanck smear, FNAC, PAP smear, Woods lamp examination, Basic staining procedures like Ziehl Neelsen, Giemsa, PAP smear, Dark ground microscopy, Routine and Microscopic examination of urine, Skin biopsy, lumbar puncture etc.

- Acquire knowledge in clinical dermatology and applied basic sciences such as anatomy, physiology, biochemistry, immunology, molecular biology, microbiology, pathology and pharmacology including therapeutics in relation to skin, STD and leprosy as listed in the syllabus.
- Describe the current treatment modalities and must be aware of latest treatment of various diseases of skin, STD and leprosy.
- Describe the preventive aspects, education/ counselling services to the patient and describe National Control Programme of India for Leprosy, STDs and HIV infections.
- Do dermatological surgery such as : Skin biopsy, Electrocautery and fulguration, electrolysis, comedone extraction, chemical peels, Dermabrasion, excision of growths and cysts, skin punch grafting, hair transplantation, cryosurgery, nail surgery etc & Needle aspiration of swellings.

Programme Outcomes

PO1. General medical skills as learnt in MBBS to be maintained:

PO2 Identify social, economic, environmental, biological and emotional determinants of patients, and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care to patients at individual and community level against skin, venereal disease and leprosy.

PO3 Recognize the emotional and behavioral characteristics of patients and keep these fundamental attributes in focus while dealing with them

PO4 Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities, with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion

P05 Should be able to function as a part of a team, develop an attitude of cooperation

P.06 Recognize conditions that may be outside the area of his specialty/competence• and refer them to the proper specialist

Programme Specific Outcomes

PSO1:Be able to identify ,classify and differenatiate cutaneous findings in dermatological terms in a systematic way

PSO2.Provide quality patients care-Diagnosis,Treatment of diseases related to skin

PSO3.Teach the medical paramedical students in the specialities

PSO4. Be able to perform systemic examination (chest, cardiac, abdomen, neurological, genitals, oral, eye and gynaecological examination) relevant to dermatologic condition.

PSO5: Be competent to manage dermatologic emergencies like angioedema, toxic epidermal necrolysis (TEN), Stevens-Johnson syndrome (SJS), pemphigus, drug reaction and necrotic erythema nodosum leprosum (ENL).

PSO6. Be able to plan and deliver comprehensive treatment for diseases using principles of rational drug therapy.

PSO7: Be able to plan and advice measures for the prevention of infectious disease.

PSO8. Be able to plan rehabilitation of patient suffering from chronic illness and disability and those with special needs like leprosy.

Tentative Schedule for three years of MD training

In-patient (ward) : 6 months

OPD & special clinics(such as allergy, psoriasis, pigmentary, dermatological surgery):

Dermatology 18 months

STD 6 months
Leprosy 3 months

Special postings – Pathology, Microbiology - 2 weeks each
Internal medicine- 1 month
Plastic surgery -2 weeks

External postings(outside the parent institute) will be assigned for STD/HIV/
Leprosy and cosmetic dermatology training depending on the convenience
of the external institutes(within the time allotted for dermatology)

Teaching activities

One teaching activity each day

- Journal club (at least once a week)
- STD/Leprosy discussion (at least once a week)
- Short presentations (at least once a week)
- Seminars (at least once a week)
- Histopathology discussion (at least once a week)
- Clinical case discussion (at least 2 times a week)

Research papers /publications/presentations:

Candidates will be required to publish at least one paper in an indexed journal and will be encouraged to present papers in state as well as national conferences on a regular basis

Thesis

Submission of research work 6 months before the final Examination.

Courses

Paper I Basic Sciences in Relation to the Specialty (Course 1 – U19MDDR01)

CO1: Describe structure, functions and development of human skin.

CO2: Describe ultrastructural aspects of epidermis, epidermal appendages, dermoepidermal junction, dermis, and sub-cutis.

CO3: Describe basic pathologic patterns and reactions of skin.

CO4: Demonstrate the knowledge of common laboratory stains and procedures used in the histopathologic diagnosis of skin diseases and special techniques such as immunofluorescence, immunoperoxidase and other related techniques.

CO5: Describe disorders of epidermal appendages and related disorders.

Topics Related to Allied Basic Sciences

- The structure, function and development of human skin.
- Skin as a barrier
- Ultra structural aspects of epidermis, epidermal appendages, dermoepidermal junction, dermis, and sub-cutis
- Molecular biology and genetics in relation to the skin.
- Epidermal cell kinetics and Keratinization
- Lipids of epidermis and sebaceous glands
- Percutaneous absorption
- Biology of eccrine and apocrine sweat glands
- **Biology of hair follicles, sebaceous glands and nails**
- Biology of melanocytes and melanin formation
- **Disorders of keratinization**
-
- Epidermal proteins
- Dermal connective tissue : collagen, elastin, reticulin, basement membrane and ground substance
- Metabolism of carbohydrates, proteins, fats and steroids by the skin
- Cutaneous vasculature and vascular responses
- Mechanism of cutaneous wound healing
- Cellular and molecular biology of cutaneous inflammation
- Immunological aspects of skin
- HLA system, Immunoglobulins, cytokines
- Complement system
- Hyper-sensitivity and allergy
- Cutaneous carcinogens
- Basics of cutaneous bacteriology, mycology, virology, parasitology and defense mechanism.
- **Common laboratory procedures, stains, culture media and related serological tests**
- Basic pathologic reaction pattern in skin
- Common and special histopathological stains and procedures used in the diagnosis of skin diseases and Special techniques such as immunofluorescence, immunoperoxidase and other related techniques.

Paper - II Dermatology and Therapeutics (Course 2 – U19MDDR02)

CO1: Describe pharmacokinetics and principles of topical and systemic therapy.

CO2: Describe drug reaction, its diagnosis and management.

CO3: Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion in dermatological conditions.

CO4: Ability to plan and deliver comprehensive treatment for diseases using principles of rational drug therapy.

CO5: Acquire knowledge of the basics of laser operation and precautions which needs to be taken.

THERAPEUTICS

Topical Therapy

- Pharmacokinetics and topical applications of drugs
- **Principles of topical therapy, topical formulations**

Topical Agents

- Glucocorticoids, analgesics, anaesthetics, antiinflammatory, anti microbial, anti parasitic, antiperspirants, antipruritic, antiviral, astringents, bleaching agents, keratolytics and keratoplastic agents.
- **Therapies:antiviral, topical antibiotics, topical antifungal agents, sun-screens, cytotoxic agents, cosmetics and skin care products, emollients and moisturizers.**
- **Management of alopecia**

Systemic Therapy

- Systemic glucocorticoids,antihistamines, antibiotics, sulfones, aminoquinolones, cytotoxic and antimetabolic agents, oral retinoids, antihistamines, antiviral drugs, oral antifungal agents, immunosuppressive and immunomodulatory drugs, thalidomide.
- Phakomatosis
- Oral retinoids and teratogenicity

Dermatological surgery

- Phototherapy,photochemotherapy, electrocautery, electrolysis, cryotherapy,tattooing, intra-lesional injections, etc.

Paper - III Dermatology in relation to systemic diseases (Course 3 – U19MDDR03)

- CO1: Describe cutaneous manifestations of systemic disorders.
- CO2: Describe etiology, pathophysiology, principles of diagnosis and management of common problems in dermatology including emergencies in adults and children
- CO3: Describe common dermatological malignancies in the country and their management including prevention.
- CO4: Should be expert in evaluation of ECG, chest X-ray (CXR), biochemical, haematology and immunology reports related to dermatology.
- CO5: Should also have a broad idea how to approach an uncommon dermatological disease.

Cutaneous Manifestations of Disease in Other Organ Systems

- Sarcoidosis of the skin
- Cutaneous Manifestations of Internal Malignancy
- Acanthosis Nigricans- role in diabetes detection and Gastrointestinal malignancies
- Papular Mucinosis
- Neurocutaneous Disease
- Tuberous Sclerosis Complex
- Neurofibromatosis
- Dermatological manifestations of anti psychotic medications
- Ataxia Telangiectasia
- Behcet's Disease
- Steven Johnson Syndrome

Skin Manifestations of systemic disorders

- Skin and disorders of the alimentary tract
- Hepatobiliary system and the skin
- Cutaneous changes in renal, cardiovascular, pulmonary and endocrine disorders
- Skin changes in pregnancy
- **Cutaneous changes in haematological disease**

Paper - IV Venereology and Leprosy and Recent Advances (Course 4 – U19MDDR04)

- CO1: Should be competent in the clinical approach to the patient of STDs and HIV/AIDS.
- CO2: Should be able to interpret the histopathological diagnosis including laboratory aids related with venereology.
- CO3: Able to perform dark ground illumination, gram stain, Bubo aspiration and tissue smear.
- CO4: Able to manage the patient according to syndromic approach for treatment of STDs.

- CO5: The student should be able to diagnose and approach the case of leprosy.
- CO6: The student should be able to perform AFB smear.
- CO7: The student should be able to manage cases of lepra reaction.
- CO8: The student should be able to identify, judge and decide when to refer the patients at appropriate level for surgery or rehabilitation.
- CO9: The student should be able to plan rehabilitation of patient suffering from chronic illness and disability and those with special needs like leprosy.

STD

- **Clinical approach to the patient with STD**
- **Anatomy of male and female genitalia**
- Epidemiology of STD's
- Viral STD's including HIV, HSV, HPV, Molluscum contagiosum, Hep B etc.
- Bacterial STD's : Syphilis, gonorrhoea, chancroid, donovanosis, bacterial vaginosis
- Chlamydial and mycoplasma infections : Lymphogranuloma venereum, urethritis, cervicitis, NGU
- Fungal : Candidiasis
- Protozoal : Trichomoniasis
- Ectoparasitic : scabies, pediculosis infestations.
- Syndromic management of STDs
- STDs in reproductive health and paediatrics
- STDs and HIV
- **Prevention, counselling and education of different STD's including HIV**
- National control programmes of STDs and HIV infection
- Medicolegal, social aspects of STD's including psychological and behavioural abnormalities in STD patients

LEPROSY

- **Approach to the patient with leprosy**
- Epidemiological aspects
- Structure, biochemistry, microbiology of Mycobacterium leprae
- Animal models
- Pathogenesis
- Classification
- Immunology and molecular biological aspects
- Histopathology and diagnosis including laboratory aids

- Clinical features
- Reactions
- Systemic involvement (ocular, bone, mucosa, testes,.endocrine etc.)
- Pregnancy and leprosy
- HIV infection and leprosy
- Therapeutic aspects including newer drugs
- Immunotherapy
- Disabilities, deformities and rehabilitation
- Prevention, education and counselling
- **National leprosy control, elimination ,eradication programmes**

Soft Skills (Course 5 – U 1 9 MDDR05)

CO1: Competency to conduct a clinical research.

CO2: Competency to work as a part of a team.

CO3: Knowledge of medical ethics and etiquette.

CO4: Ability to interact with the patients and their relatives in an effective manner.

CO5: Attitude to be a lifelong learner.

CO6: Ability to be an effective teacher/communicator.

This is an elective course which spreads across the duration of the program.

Assessments/ Examinations

Concurrent examination/assessment

The purpose of the concurrent assessment is to give regular feed back to the candidates about their performance and to prepare them for the final terminal examination by giving them exposure to the examination pattern.

The practical examination (300 marks) will include long case, short case, spotters, ward rounds, viva voce on the topics covered during the period by the hospital/institution.

FINAL EXAMINATION

Theory

Total Marks-	100 each
PAPER I	- Basic Sciences in relation to the-Speciality
PAPER II	- Dermatology & Therapeutics
PAPER III	- Dermatology in relation to systemic diseases
PAPER IV	- Venereology and Leprosy recent advances

Practical Examination

Three cases (one long case, one each semilong/short case of Dermatology/ STD, Leprosy), 10 Spotters , OSCE

Viva voce comprising of :Radiological, Biochemical Investigations,
Instruments
Drugs and Clinical Problems in Dermatology,
Discussion of Histopathology slides – 5 slides

THEORY SYLLABUS

Fundamentals of Cutaneous Diagnosis-Basic skin lesions, history taking, examination of the patient including relevant diagnostic, clinical tests and aids

Topics Related to Allied Basic Sciences

- The structure, function and development of human skin.
- Skin as a barrier
- Ultra structural aspects of epidermis, epidermal appendages, dermoepidermal junction, dermis, and sub-cutis
- Molecular biology and genetics in relation to the skin.
- Epidermal cell kinetics and Keratinization
- Lipids of epidermis and sebaceous glands
- Percutaneous absorption
- Biology of eccrine and apocrine sweat glands
- Biology of hair follicles, sebaceous glands and nails
- Biology of melanocytes and melanin formation
- Disorders of keratinization
- Epidermal proteins
- Dermal connective tissue : collagen, elastin, reticulin, basement membrane and ground substance
- Metabolism of carbohydrates, proteins, fats and steroids by the skin
- Cutaneous vasculature and vascular responses
- Mechanism of cutaneous wound healing
- Cellular and molecular biology of cutaneous inflammation
- Immunological aspects of skin
- HLA system, Immunoglobulins, cytokines
- Complement system
- Hyper-sensitivity and allergy
- Cutaneous carcinogens
- Basics of cutaneous bacteriology, mycology, virology, parasitology and defense mechanism.
- Common laboratory procedures, stains, culture media and related serological tests
- Basic pathologic reaction pattern in skin
- Common and special histopathological stains and procedures used in the diagnosis of skin diseases and Special techniques such as immunofluorescence, immunoperoxidase and other related techniques.

Clinical Dermatology

- Epidemiology of cutaneous diseases

- Psychologic aspects of skin disease and psycho-cutaneous disorders
- Pathophysiology and clinical aspects of pruritus.

Papulo-squamous Diseases

- Psoriasis, Pityriasis rubra pilaris, pityriasis rosea, Lichen Planus, lichenoid eruptions
- Parapsoriasis,
- Darier's disease. Porokeratosis
- Ichthyoses and ichthyosiform dermatoses, Keratodermas

Vesiculo-bullous Disorders

- Erythema multiforme, Stevens-Johnson syndrome, toxic epidermal necrolysis and pemphigus group of disorders
- Bullous pemphigoid
- Chronic bullous disease of childhood
- Herpes gestationis
- Mechanobullous (hereditary and acquired)
- Epidermolysis bullosa acquisita
- Dermatitis herpetiformis
- Subcorneal pustular dermatoses

Disorders of Epidermal Appendages

- Disorders of hair and nails
- Disorders of sebaceous glands : Acne
- Rosacea, perioral dermatitis
- Disorders of eccrine and apocrine sweat glands

Tumours

- Naevi and hamartomas
- Precancerous Skin lesions, Squamous cell carcinoma and Basal cell carcinoma, malignant melanoma
- Benign epithelial tumours, appendageal tumours

Disorders of pigmentation

- Vitiligo, Albinism, Benign neoplasia and hyperplasia of melanocytes, Dysplastic melanocytic nevi, hyperpigmentation

Inflammatory Disorders of the Dermis

- Acute Febrile Neutrophilic dermatoses
- Erythema elevatum diutinum
- Cutaneous eosinophilic diseases
- Granuloma faciale
- Pyoderma gangrenosum

- Erythema annulare centrifugum and other Figurate Erythemas
- Granuloma annulare
- Malignant atrophic papulosis
- Neoplasms, Pseudo neoplasms and Hyperplasias of the Dermis
- Vascular Anomalies, Kaposi's Sarcoma
- Anetoderma and other Atrophic Disorders of the skin
- Neoplasias and hyperplasias of Neural and Muscular origin
- Elastosis Perforans Serpiginosa, Reactive Perforating Collagenosis, Kyrle's disease

Lymphomas, Pseudolymphomas and Related Conditions

Disorders of Subcutaneous Tissue

- Panniculitis
- Lipodystrophy
- Neoplasms of the subcutaneous Fat

Disorders of the Mucocutaneous Integument, dermatitis & eczemas

- Biology and disorders of oral mucosa
- Disorders of ano-genitalia of males and females
- Genetic Immunodeficiency Disease
- Urticaria and Angioedema
- Disorders associated with complement abnormalities
- Graft-versus-Host Disease
- Muco-cutaneous manifestations in immunosuppressed host other than HIV-infection
- Contact Dermatitis
- Auto sensitization dermatitis
- Atopic dermatitis (Atopic Eczema)
- Nummular eczematous dermatitis
- Seborrhoeic dermatitis
- Vesicular palmoplantar eczema
- Erythrodermas

Skin Changes Due to Mechanical and Physical Factors

- Occupational skin disease
- Radiation to the skin

- Skin diseases due to cold, heat

Photobiology of skin

- Normal reaction to ultra violet rays and sun exposure

Disorders Due to Drugs and Chemical Agents

- Cutaneous reactions and mucocutaneous reactions to chemicals and drugs
- Pathological response to UVR and sun exposure
- Cutaneous manifestations of drug Abuse

Abnormal vascular response

- Erythemas including annular erythemas
- Urticaria
- Vasculitis

Dermatology and age of man

- Ageing of skin
- Neonatal dermatological problems
- Pediatric and adolescent problems
- Geriatric dermatological problems

Skin Lesions in nutritional and metabolic disorders

- Porphyrias
- Xanthomas
- Disorders of lipid metabolism and storage
- Mucinoses
- Amyloidosis
- Angiokeratoma corporis diffusum
- Lipoid proteinosis
- Malabsorption
- Vitamin and mineral deficiency and excess

Skin Manifestations of systemic disorders

- Skin and disorders of the alimentary tract
- Hepatobiliary system and the skin
- Cutaneous changes in renal, cardiovascular, pulmonary and endocrine disorders
- Skin changes in pregnancy
- Cutaneous changes in haematological disease

Genodermatosis

- Phacomatosis
- Tuberous sclerosis
- Incontinentia pigmenti
- Ectodermal dysplasia
- Xeroderma pigmentosum

Connective tissue disorder

- Lupus erythematosus
- Dermatomyositis
- Scleroderma
- MCTD (Mixed connective Tissue Disease)
- Relapsing polychondritis
- Rheumatoid arthritis, rheumatic fever and gout
- Sjogren's syndrome
- Raynaud's phenomenon
- Multicentric reticulohistiocytosis

Cutaneous Manifestations of Disease in Other Organ Systems

- Sarcoidosis of the skin
- Cutaneous Manifestations of Internal Malignancy
- Acanthosis Nigricans
- Papular Mucinosis
- Neurocutaneous Disease
- Tuberous Sclerosis Complex
- Neurofibromatosis
- Ataxia Telangiectasia
- Behcet's Disease

Bacterial infections

- Pyodermas : Staphylococcus, Streptococcus and others
- Staphylococcal scalded-skin syndrome
- Soft tissue infections : Erysipelas, Cellulitis
- Systemic bacterial infections with cutaneous manifestations
- Cutaneous tuberculosis and atypical mycobacterial infections
- Actinomycetoma

Fungal infections

- Superficial fungal infection : (dermatophytosis, yeast, others)
- Deep fungal infections

Viral and rickettsial infections

- Herpes simplex virus infections
- Varicella – zoster infection
- Human papilloma virus
- Molluscum contagiosum
- Hepatitis B, C
- Rubella
- Measles

THERAPEUTICS

Topical Therapy

- Pharmacokinetics and topical applications of drugs
- Principles of topical therapy, topical formulations

Topical Agents

- Glucocorticoids, analgesics, anaesthetics, antiinflammatory, anti microbial, anti parasitic, antiperspirants, antipruritic, antiviral, astringents, bleaching agents, keratolytics and keratoplastic agents.
- Therapies:antiviral, topical antibiotics, topical antifungal agents, sun-screens, cytotoxic agents, cosmetics and skin care products, emollients and moisturizers.

Systemic Therapy

- Systemic glucocorticoids,antihistamines, antibiotics, sulfones, aminoquinolones, cytotoxic and antimetabolic agents, oral retinoids, antihistamines, antiviral drugs, oral antifungal agents, immunosuppressive and immunomodulatory drugs, thalidomide.

Dermatological surgery

- Phototherapy,photochemotherapy, electrocautery, electrolysis, cryotherapy,tattooing, intra-lesional injections, etc.

Dermatosurgery : Introduction and approach

- Skin resurfacing : chemical peels
- Skin resurfacing : dermabrasion
- Skin resurfacing : Laser
- Skin punch grafting
- Wound dressings

- Tumescant liposuction
- Substances for soft tissue augmentation
- Hair transplantation
- Cryosurgery
- Moh's micrographic surgery
- Nail surgery

STD

- Clinical approach to the patient with STD
- Anatomy of male and female genitalia
- Epidemiology of STD's
- Viral STD's including HIV, HSV, HPV, Molluscum contagiosum, Hep B etc.
- Bacterial STD's : Syphilis, gonorrhoea, chancroid, donovanosis, bacterial vaginosis
- Chlamydial and mycoplasma infections : Lymphogranuloma venereum, urethritis, cervicitis, NGU
- Fungal : Candidiasis
- Protozoal : Trichomoniasis
- Ectoparasitic : scabies, pediculosis infestations.
- Syndromic management of STDs
- STDs in reproductive health and paediatrics
- STDs and HIV
- Prevention, counselling and education of different STD's including HIV
- National control programmes of STDs and HIV infection
- Medicolegal, social aspects of STD's including psychological and behavioural abnormalities in STD patients

LEPROSY

- Approach to the patient with leprosy
- Epidemiological aspects
- Structure, biochemistry, microbiology of Mycobacterium leprae
- Animal models
- Pathogenesis
- Classification
- Immunology and molecular biological aspects
- Histopathology and diagnosis including laboratory aids
- Clinical features
- Reactions
- Systemic involvement (ocular, bone, mucosa, testes, endocrine etc.)

- Pregnancy and leprosy
- HIV infection and leprosy
- Therapeutic aspects including newer drugs
- Immunotherapy
- Disabilities, deformities and rehabilitation
- Prevention, education and counselling
- National leprosy control, elimination ,eradication programmes

MINIMUM SKILLS TO BE ACQUIRED DURING THE TRAINING PERIOD

PROCEDURES

- Skin Scraping for fungus
- Nail Scraping for fungus
- Hair for fungus
- Slit skin smear examination for AFB
- Smear examination and preparation
 - Tzanck smear
 - Ziehl Neelsen stain
 - Gram's stain
 - Leishman's stain
- FNAC
- Intralesional injections
- Skin Biopsy
- Electrosurgery
- Chemical Cautery
- Cryosurgery
- Punch grafting/biopsy/other aspects of vitiligo surgery
- Skin resurfacing-Dermabrasion
 - Laser
 - Chemical peels
- Nail Surgery
- Comedone/Milia extraction
- Excision of growth/papilloma/cysts etc.
- Woods lamp examination
- Dark ground microscopy
- Allergy testing ,patch testing ,photo patch testing

- Phototherapy dosage schedules and administration

SAMPLE CASES FOR PRESENTATION AND DISCUSSION

LONG CASES

- Systemic sclerosis (Scleroderma)
- SLE
- Disseminated discoid lupus erythematosus
- Dermatomyositis/mixed connective tissue disorders
- Psoriatic arthritis
- Pustular psoriasis
- Pemphigus and its variants
- Pemphigoid
- Chronic bullous dermatosis of childhood
- SJ syndrome/TEN
- Dermatitis herpetiformis
- Reiter's disease
- Sarcoidosis
- Tuberculosis of skin
- Erythroderma
- Airborne contact dermatitis
- Pityriasis rubra pilaris
- Ichthyosiform dermatoses
- Parapsoriasis
- Deep fungal infections
- Behcet's disease
- Xanthoma
- Lipoid proteinosis
- Exanthematous drug eruptions
- Photodermatitis

STD

- Genital Ulcers
- Genital discharge
- Venereal warts
- Herpes progenitalis
- Balanoposthitis
- HIV

LEPROSY

- All types of leprosy cases (TT, BT,BB,BL,LL)
- ENL
- Type I reaction
- Histoid leprosy
- Trophic ulcer and deformities in Leprosy

SHORT CASES

- Neurofibromatosis
- Tubrous sclerosis
- Epidermal Naevi
- Haemangioma
- Sebaceous Naevi
- Alopecia areata and its variants
- Superficial fungal infections
- Benign tumors of skin
- BCC
- Lichen planus and lichenoid reactions
- Other papulosquamous disorders
- Darier's disease
- Pityriasis rubra pilaris
- Pityriasis rosea
- Erythema multiforme
- Epidermolysis Bullosa
- Pyoderma gangrenosum
- Acute febrile neutrophilic dermatoses
- Lymphomas and pseudolymphomas
- Eczemas
- Vasculitis
- Porphyria
- Xanthomas
- Amyloidosis
- DLE
- Morphoea
- Scleredema
- Mycetoma
- Varicella Zoster infection
- Molluscum contagiosum
- Scabies/ectoparasites
- Xeroderma pigmentosum
- Acne and related disorders
- Rosacea
- Lymphangioma
- Porokeratosis

- Granuloma annulare
- Angiokeratoma
- Urticaria pigmentosa
- Pigmentary disorders (Melasma/ Vitiligo etc.)

SAMPLE QUESTIONS FOR THEORY PAPER

- Syndromic approach to genital ulcer/genital discharge
- Histoid Leprosy
- Vaccines in Leprosy
- HIV and Skin
- Primary Neuritic Leprosy
- Reversal reactions in leprosy
- HIV and vaccines
- Cutaneous bacterial flora
- Kaposi's sarcoma
- Inguinal Bubo in STDs
- Tacrolimus
- Bacillary angiomatosis
- SLE and Pregnancy
- Desmosome-Tonofilament complex
- Pilosebaceous Unit
- Skin as a barrier
- Cytodiagnosis
- Pathogenesis of psoriasis
- Wood's lamp
- Lasers in dermatology
- Mechanism of contact dermatitis
- Chlamydia trachomatis
- Paraneoplastic pemphigus
- Antioxidants
- Histopathology of-mycosis fungoides
- Porphyrin -Haem synthesis
- Diabetic dermopathy
- Management of severe pruritus
- Diagnosis and treatment of PKDL
- Raynaud's phenomenon
- Langerhans cells
- Melanogenesis
- Process of Keratinization
- Structure of nail
- Lichenoid eruption
- Scleroderma

- Hirsutism
- Serology of Leprosy
- Immunofluorescence in dermatology
- Skin failure
- Newer Antihistamines
- Newer anti leprosy drugs
- HAART therapy in AIDS
- Newer antifungal drugs
- Sunscreens
- Reiter's disease
- Systemic complications in leprosy
- Skin manifestations of thyroid disorders
- Immunomodulators in dermatology
- PCR in dermatology
- Genital ulcer disease
- Secondary syphilis
- Gonococcal urethritis
- H. Ducreyi
- LGV

BOOKS AND JOURNALS WHICH THE CANDIDATE MUST READ

Books

Rook's Text book of Dermatology
 Dermatology in internal medicine by Fitz Patrick
 Pediatric dermatology - Harper
 IADVL text book of Dermatology
 Text book of Sexually Transmitted diseases by King Holmes
 Text book of STD/Aids –V K Sharma
 Text book of STD -Bhushan Kumar
 Leprosy by Ridley Jopling
 Leprosy –Hastings
 IAL text book of Leprosy
 Dermatotomy and cosmetology by Sawant
 Dermatological surgery by Katz
 Manual of dermatological therapeutics –Arndt
 Dermatological therapy -polano
 Dermatological drug therapy- wolverton

Journals

Indian Journal of Dermatology, Venereology & Leprology
 Indian Journal of Leprosy

Indian Journal of Sexually Transmitted diseases
International Journal of Dermatology
International Journal of Leprosy
Leprosy review
Archives of Dermatology
British Journal of Dermatology
Journal of investigative dermatology
Journal of cosmetic and laser therapy

GUIDELINES FOR WRITING THESIS

Research shall form an integral part of the education programme of all candidates. The Basic aim of requiring the candidates to write a thesis is to familiarize him/her with research methodology in general as well as specific to dermatology. The members of the faculty guiding the thesis work for the candidate shall ensure that the subject matter selected for the thesis is **original and practical**.

Guidelines

- I. The thesis may be normally restricted to the size to 100 pages. To achieve this, following points may be kept in view;
 - (i) Only contemporary and relevant literature may be reviewed.
 - (ii) The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference may be given.
 - (iii) Illustrative material may be restricted.
 - (iv) Since most of the difficulties faced by the residents relate to the work in clinical subject or clinically oriented laboratory subjects the following steps are suggested:
 - For prospective study, as far as possible, the number of cases should be such that adequate material, judged from the hospital attendance, will be available and the candidate will be able to collect the case material within a period of 6-12 months so that he/she is in a position to complete the work within the stipulated time.
 - The objectives of the study should be well defined.
 - As far as possible, only clinical or laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.

- Technical assistance, wherever necessary, may be provided by the department concerned. The resident of one speciality taking up some problem related to some other speciality should have some basic knowledge about the subject and he/she should be able to perform the investigations independently, wherever some specialised laboratory investigations are required a co-guide may be co-opted from the concerned investigative department, the quantum of laboratory work to be carried out by the candidate should be decided by the guide and co-guide by mutual consultation.
- The Clinical residents may not ordinarily be expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected or the use of chemicals or radio isotopes not readily available. They should however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies should be feasible within the existing facilities.
- The residents should be able to use freely the surgical pathology/autopsy data if it is restricted to diagnosis only, if however, detailed historic data are required the resident will have to study the cases himself with the help of the guide/co-guide. The same will apply in case of clinical data.
- Statistical methods used for analysis should be described in detail.

Guidelines for Writing of Thesis

Title - Should be brief, clear and focus on the relevance of the topic.

Introduction – Should state the purpose of study, mention lacunae in current knowledge and enunciate the Hypothesis, if any.

Objectives-General & Specific

Review of Literature – Should be relevant, complete and current to date.

Material and Methods- Should include the type of study (prospective, retrospective, controlled double blind) details of material & experimental design procedure used for data collection & statistical methods employed; statement of limitations ethical issues involved.

Observations– Should be Organized in readily identifiable sections having correct analysis of data be presented in appropriate charts, tables, graphs &

diagram etc. These should be statistically interpreted.

Discussion- Observations of the study should be discussed and compared with other research studies. The discussion should highlight original findings and should also include suggestion for future.

Summary and Conclusion

Bibliography - Should be correctly arranged in Vancouver pattern.

Appendix—All tools used for data collection such as questionnaire, interview schedules, observation check lists etc should be put in the annexure.

PART IV

Venereology and Leprosy and Recent Advances

Essays:

1. Classify antiretroviral drugs. Discuss the adverse effects of these drugs

Short essays:

2. Leprosy vaccines
3. Histoid leprosy
4. Dapsone resistance
5. Bone involvement in leprosy
6. Circinate balanitis
7. Kaposi's sarcoma
8. Syphilis in cognito

XXXXXXX



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program

MD General Medicine

(Revised with effect from 2019-2020 onwards)

Program Outcomes:

- PO1: Ability to apply critical thinking in identification of diseases
- PO2: Effective communication and developing rapport with the patients.
- PO3: Social interaction and developing acceptance among the patients
- PO4: The ability to formulate cost effective and patient friendly treatment plans
- PO5: Ethics of medical practise towards patient and colleagues is learnt
- PO6: Competency to order judicious investigations for the patients
- PO7: Attitude to sustain self directed & life long learning
- PO8: Ability to identify social, economic, environmental, biological determinants of an adult and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care.

Program Specific Outcome:

- PSO1: Competency to collect detailed history, perform full physical examination and make proper clinical diagnosis. Perform relevant investigative and therapeutic procedures for the care of the patients interpret important imaging and laboratory results.
- PSO2: Competency to diagnose illness based on the analysis of history, physical examination and confirm on further investigative work up. Plan and deliver comprehensive treatment using the principles of rational drug therapy.
- PSO3: Competency to manage emergencies efficiently by providing BLS and ALS in emergency situations.
- PSO4: Ability to document case details including epidemiological data.
- PSO5: Ability to recognize conditions that may be outside the area of the specialty / competence and to refer them to an appropriate specialist.
- PSO6: Respect patient's rights and privileges including patients right to information and right to seek a second opinion. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.
- PSO7: Communication skills in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- PSO8: Competence in basic concept of research methodology and epidemiology.
- PSO9: Ability to facilitate learning of medical / nursing students, practicing physicians, paramedical health workers and other providers as a teacher – trainer.

GOAL

The goal of post graduate course M D General Medicine is to train a MBBS Graduate in to a competent, caring and astute physician who:

- Has acquired the competencies pertaining to medicine that are required to be practiced in the community, backed by scientific knowledge and skill base. Has acquired the skills to effectively communicate with the patient, family and the community.

- Is aware of the contemporary advances and developments in medical sciences related to medicine and evidences keen interest in continuing medical education.
- Is oriented to principles of research methodology.
- Recognize the health needs of the population and carries out professional obligations in keeping with the principles of national health policy and professional ethics and
- Be a motivated 'teacher'- defined as a doctor keen to share his knowledge & Skills with his medical & paramedical professionals.

OBJECTIVES

The following objectives are laid out to fulfill the goals of the course. These are to be achieved by the time the candidate complete the course.

At the end of the training period the candidate must be able to :

- Practice the specialty of the med maintaining high professional standards. Identify social, economic, environmental, biological determinants of an adult and institute diagnostic, therapeutic, rehabilitative, preventive and promotive measures to provide holistic care.
- Collect detailed history, perform full physical examination and make proper clinical diagnosis. Perform relevant investigative and therapeutic procedures for the care of the patients interpret important imaging and laboratory results.
- Diagnose illness based on the analysis of history, physical examination and confirm on further investigative work up. Plan and deliver comprehensive treatment using the principles of rational drug therapy.
- Manage emergencies efficiently by providing BLS and ALS in emergency situations.
- Demonstrate skills in documentation of case details including epidemiological data.
- Knowledge of basic sciences relevant to medicine appropriately.
- Recognize conditions that may be outside the area of the specialty / competence and to refer them to an appropriate specialist.
- Respect patient's rights and privileges including patients right to information and right to seek a second opinion. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities. Demonstrate communication skills in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- Develop skills of a self-directed learner, recognize continuing medical educational needs, use appropriate learning recourses, and critically analyses relevant published literature in order to practice evidence-based medicine.

- Demonstrate competence in basic concept of research methodology and epidemiology.
- Facilitate learning medical / nursing students, practicing physicians, paramedical health workers and other providers as a teacher – trainer.
- Under take audit, use of information technology tools and carryout research - - both basic and clinical. With the aim of publishing the work and presenting the work at various scientific forum.
- Professional honesty and integrity are to be maintained.
- Be humble and accept the limitation in the knowledge and skill and to seek help from colleagues when needed.

DURATION OF THE COURSE

The course of the study shall be for three years consisting of six terms and each year consisting of two terms.

COURSE CONTENT

Knowledge

1. **BASIC SCIENCES:**

Applied aspects of Anatomy, physiology, Biochemistry, Pathology, Haematology and Microbiology and Pharmacology

2. **GENERAL MEDICAL TOPICS**

History of medicine

Clinical History and Examination- Collecting history in detail, carryout clinical examination of various systems and diagnose the condition on clinical grounds.

Rationale of diagnostic tests - ordering diagnostic tests with prioritising the needs based on the clinical, hospital and the socio-economic condition of the patient.

Concept of Essential drugs and Rational use of drugs

Communication skill with the patients – Learning effective communication skills including compassionate explanation and giving emotional support to the suffering patient and his family.

Statistics – Descriptive statistics, analytical statistics, qualitative research methodology, research design and critical review of statistical procedures

Principles of evidence based medicine – Understanding journal based literature study the value of textbook, reference book article; the value of review articles; original articles and their assessment. Understanding the value of retrospective, prospective randomized, controlled and blinded studies – the principles including the meaning of various biostatistical tests applied in these studies.

Medical Ethics & Social responsibilities of physicians.

Use of computers in medicine

3. GENERAL MEDICINE TOPICS

Genetics: Basic principles of genetics, molecular basis of cancer, genetics and genetic engineering, human genome mapping, chromosomal disorders, genetic basis of cancer, genetic and gene therapy.

Immunology- basics in immunology, Auto immune disorders, immuno deficiency diseases, hypersensitivity reactions- anaphylaxis, angioedema, adverse drug reactions, Complement, HLA system. Transplantation immunology.

Fluid and electrolyte balance/Acid – base metabolism – The body fluid compartments, metabolism of water and electrolytes, factors maintaining homeostasis, diagnosis and management of acidosis and alkalosis & Electrolyte imbalance

Blood transfusion: - Blood grouping, cross matching, component therapy, complication of blood transfusion, blood substitutes,

Shock and multi - organ Failure:- Types of shock, diagnosis, resuscitation pharmacological support, ARDS, ventilator support and its prevention.

Nutrition:- RDA of nutritional substances, nutritional assessment, nutritional recall, metabolic response to stress, malnutrition, PCM, nutritional deficiency states, nutritional response in stress, enteral and parental nutrition, dietary advice in obesity, DM renal , hepatic failure, hyperlipidaemia, IHD.

Poisoning:- OP compound, sedatives, alcohol, corrosives, anti-convulsants, general principles of management and specific management of poisons including snakes bites, scorpion stings.

Toxicology – Heavy metal poisoning, Flurosis, Lathyrism
Pre anesthetic and postoperative medical problems
Geriatric medicines
Pregnancy medicine
Adolescent medicine

4 INFECTIOUS DISEASES

Basic considerations: Host – parasite interaction, Immunization principles, Lab. Diagnosis of infectious diseases, vaccination (BCG, Typhoid, Tetanus, Hepatitis A & B), Antimicrobial agents, Mol. Mechanism of microbial pathogenesis. Clinical syndromes, (community setting): - Septic shock, Infective endocarditis, PUO, infectious diarrhoea, Bacterial food poisoning, Common STD syndromes, inf. Complications of bites and stings, infections of skin, muscle, and soft tissue, Osteomyelitis, Infra-abdominal infections and abscess, P.I.D Nosocomial Infections: Hospital acquired infection, infections in Transplantpts, Infection control in hospital.

Bacterial infections: Pneumococcal, staphylococcal, streptococcal& Enterococcal, Tetanus, Diphtheri, Anthrax, Listeria, Gas gangrene, Botulism, other clostridial infections.

Meningococcal, H.pylori, salmonella, shigella, cholera, legionella, moraxella Brucella, Pseudomonas, Mixed anaerobic infections, H. influenza, Gonococcal, Pertussis, Plague, Campylobacter, Donovanosis, Actinomucosis.

Anaerobic infections

Mycobacterial diseases: Tuberculosis, Leprosy, Non-tubercular mycobacterium, Spirochaetal: Syphilis, Leptospirosis, Endemic trepanomatosis.

Rickettsiae: R M spotted fevers

Mycoplasma: M. pneumoniae

Chlamydia : psittacosis

Fungal Infections: Candidiasis, Pcarinii, Aspergillosis, Mucor mycosis Coccidioidomycosis, Cryptococcosis, Histoplasmosis.

Viral Infections: Anti viral chemotherapy

DNA viruses: Herpes simplex, CMV, Chicken pox vaccinia, other poxviruses. Varicella zoster, parvovirus

Ebstein Barr, HPV

DNA & RNA respiratory viruses: Influenza

RNA viruses: Rabies, ARBO viruses (Dengue, KFD, Japanese encephalitis), Human retrovirus, Enteroviruses, Rubella.

HIV & AIDS: - Epidemiology, clinical stages, complications, opportunistic infections (OI), laboratory investigations, HAART, PEP & counseling.

Protozoal and Helminthic infections: - Life history, clinical manifestations, lab diagnosis and therapy, Amoebiasis, Malaria, Giardiasis, Taeniasis, Echinococcosis, Trichuriasis, Trichinella, Trypanosomiasis, Trichomoniasis, H.nana, D latum, Schistosomiasis, Larva Migrans syndrome.

5. CARDIO VASCULAR DISEASES

Rheumatic fever and heart diseases Mycobacterial diseases: Tuberculosis, Leprosy, Non-tubercular

Congenital heart diseases

Atherosclerosis, coronary artery disease

Primary and secondary hypertension

Cardiac Failure

Cardiac arrhythmias – tachy and brady arrhythmias, heart blocks

Infective endocarditis

Myocardial and Pericardial diseases

Pregnancy and heart diseases

Diseases of aorta

DVT and pulmonary embolism

Peripheral arterial and venous diseases

Acute and Chronic cor pulmonale

Disease of Lymphatic system

Non-cardiac surgery in cardiac patients- assessment of anaesthesia and surgery

Cardiac drug and drug interaction

Guidelines published by standard cardiology journals.

Apart from pathophysiology, clinical features and management, the importance of primary and secondary prevention must be stressed.

Clinical cardiology

- * Adequate exposure to cardiac OPD work, cardiology ward work and coronary care unit.
- * One month in cardiac OPD/Ward, and one month in CCU
- * During the posting, the student should accompany his cases for stress – ECG (TMT), echocardiography and cath lab.

6. RESPIRATORY MEDICINE:

Applied aspects of Respiratory system & Respiratory Physiology.

Mycobacteriology: Diagnostic methods, pathogenesis of Mycobacterial diseases their clinical manifestations. Pulmonary and extra pulmonary as well as disseminated Tuberculosis, its pathogenesis, clinical features diagnosis and management, National programme on Tuberculosis including DOTS.

Non Tuberculosis Respiratory infection:

Community and hospital acquired pneumonias, infections of tracheo-bronch tree including cystic, fibrosis, parasitic and fungal diseases of lungs, HIV infections and lungs.

Allergic diseases of respiratory system including bronchial asthma.

Industrial, occupational lung diseases including Interstitial Pulmonary Fibrosis

Suppurative lung diseases

Granulomatous diseases of lung including sarcoidosis.

Pulmonary manifestations of systemic diseases and drug induced lung diseases.

Tropical pulmonary eosinophilia

Diseases of pleura, mediastinum and diaphragm.

Intra- thoracic malignancies including etiology, diagnosis, staging and management of lung cancer.

Sarcoidosis

7. NERVOUS SYSTEM

Applied aspects of anatomy – Brain and spinal cord

Evaluation of CNS diseases

Clinical approach to:- Coma, head ache, seizure, Dementia, Aphasia, sleep disorders

Brain death

Cerebrovascular diseases

Cranial nerve disorders

CNS infection, Bacterial Viral, Fungal, Neurotuberculosis, parasitic

Motor system diseases

Tumors of brain and Spinal cord Extra pyramidal disorders Cerebellar disorders

Demyelinating diseases

Neuro-degenerative disorders Nutritional

Peripheral Neuropathies, polyneuropathies & Guillain Barre Syndrome

Cervical spondylosis

Disorders of muscle-Dystrophy, Myopathic syndrome

8. GASTRO INTESTINAL & HEPATOBILIARY SYSTEM

Diseases of Oesophagus

Peptic ulcer diseases and its management

Upper gastrointestinal bleed
Lower gastrointestinal bleed
Approach to Mal-absorption and mal-digestion
Inflammatory bowel diseases
Irritable bowel syndrome (I.B.S). Gastrointestinal motility disorders
Chronic Diarrhoea Disorders of peritoneum G I function tests

LIVER

Bilirubin metabolism
Cirrhosis of liver, Biliary Cirrhosis & N.C.P.F & Budd Chiari syndrome
Acute & Chronic Hepatitis –Viral, Toxic
Alcoholic liver disease
Amoebic Liver abscess Obstructive jaundice
Acute & Chronic Hepatic insufficiency
Congenital Hyperbilirubinemias
Tumors of the liver
Drugs and liver
Diseases of gall bladder
Acute and Chronic cholecystitis
Gall Stone
Disease and disorders of Pancreas: - Acute and Chronic Pancreatitis

9. ENDOCRINOLOGY & METABOLISM

Principles of Endocrinology: Mechanism of action of hormones and receptors
Assessment of endocrine function

Hypothalamus & Pituitary: Approach to pituitary diseases, diseases of anterior and posterior- pituitary tumors, Acromegaly, short stature, prolactinoma, diabetes, insipidus, SIADH, Cushing's disease, Panhypopituitarism, Sheehan's syndrome, Non secretory adenoma.

Pancreas: Hypoglycemia, Insulinomia,
Diabetes Mellitus: Prevalence, Etiopathogenesis, ADA criteria for diagnosis; ADA classification, Clinical features, investigations, complications- micro & macro –vascular, management-Diet, Exercise, oral hypoglycemics, Insulin therapy in Type 1 and type 2, Gestational diabetes, Diabetic keto-acidosis, HONK, Hypoglycemia

Thyroid: Iodine metabolism, Iodine deficiency disorder, Synthesis and secretion of thyroid hormone, hypothyroidism, hyper thyroidism, Cretinism, Sick euthyroid syndrome, thyroiditis, evaluations of nodule, ca. thyroid.

Parathyroid: Primary hyperparathyroidism, hypoparathyroidism Tetra Pseudohypoparathyroidism.

Adrenal: Steroid biochemistry, Addison's disease, Cushing's syndrome, Congenital adrenal hyperplasia, Pheochromocytoma, Primary aldosteronism. Gonads:- testes . Men – Hypogonadism – PGAS, Hypogonadotropic (Kallman's Syndrome) Hypergonadotropic (Klinefelter's syndrome), delayed puberty, puberty precocious, puberty infertility.

Ovary: delayed puberty – Turner's syndrome, polycystic ovarian diseases, hirsutism, precocious puberty, approach to amenorrhea, postmenopausal syndrome, current concepts in management.

10. SEXUAL MEDICINE:

Applied aspect of anatomy and physiology of reproductive system- male and female. Human sexual response.

Etiology: Clinical features and management of common sexual problems – male and female.

Effect of psychiatric illness and systemic diseases including commonly used drugs on reproductive system.

Infertility – male & female- etiology, clinical features, investigations and physicians role in management.

11. METABOLIC BONE DISORDER (MBD)

Bone mineral, metabolism, osteoporosis
Osteomalacia & rickets
Carcinoid tumors, hyperlipidemia

12. NEPHROLOGY

Evaluation of patient with renal diseases
Interpretation of laboratory tests
Acute renal failure
Pathogenesis, pathology, clinical features
Conservative management
Diet in renal failure
Acute glomerulonephritis including idiopathic GN Nephrotic syndrome
Urinary tract infection
Drugs and kidney
Nephrolithiasis and obstructive disorder Renal involvement in systemic diseases Diabetic nephropathy
Pregnancy and kidney
Basics of renal transplantation
Organ donation
Concept of brain death and cadaveric transplantation

Electrolyte disturbance and its management
Immuno - suppressive drugs
Slow continuous renal replacement therapy

13. HAEMATOLOGY

Haematopoiesis
Anaemias- causes, clinical features and laboratory approach and treatment
Iron deficiency, magaloblastic, haemolytic and aplastic anaemias.
Various thalasemic syndromes, Hb electrophoresis, Polycythaemias
Problem of iron overload
Autoimmune blood disorders
Transfusion medicine
Recognition and management of transfusion disorders
Transfusion in patients with Haematological diseases (Component therapy) Coagulopathy
Hyper coagulable state
Leukaemias an its managements
Myelodysplastic syndromes and mycloproliferative disorders
Platelets disorders- Purpuras- Primary and secondary. Theraputic plasmapheresis and
cytapheresis,
ABVP, CHOP Chemotherapy

14. RHEUMATOLOGY AND CONNECTIVE TISSUE DISORDERS

Structure of connective tissue- collagen, elastin and proteoglycans
Immunological mechanism and Immunogen in
Rheumatoid arthritis
SLE
Osteo arthritis
Vasculitis
Sero negative spondyloarthropathy
Crystal arthritis
Inflammatory/metabolic myopathics Arthropathics associated with Endocrine diseases
Haematologic diseases malignant diseases Fibromyalgic syndromes
Lower back pain
Systemic sclerosis
Myositis
Mixed connective Tissue disorder (MCTD)

15. EMERGENCY MEDICINE

Basic and advanced life support
Shock Syndromes
Anaphylaxis
Acid base imbalance

Multi organ failure
Poisoning – OP compound, sedatives
Basics of mechanical ventilation
Transfusion reaction
Upper G I hemorrhage Upper
Airway obstruction tension
Pneumothorax Acute Asthma
ARDS cardiac arrest
Cardiac tamponade
Hypertensive emergencies & urgencies
Status epilepticus
Coma in Diabetes Endocrinal
Emergencies Cerebral
Malaria emergencies in
Cancer infections in ICU
Antibiotic usage in ICU
Enteral & Parenteral Nutrition
Brain death
List of Skills
Cardio pulmonary resuscitation/ Cardio – version / defibrillation
Emergent airway intubations
Central venous cannulation
Arterial cannulation
Mechanical Ventilation
Temporary transvenous pacemaker
Percutaneous tracheostomy
Pericardiocentesis
Therapeutic bronchoscopy, Tube thoracotomy

16. MEDICAL ONCOLOGY

Basics of oncology
Normal cell, Cancer cell- Cell cycle and its Regulation
Molecular Biology Techniques such as Southern blot, Northern blot, western blot,
Karyotyping, FISH, PCR
Metastatic cascade
Angiogenesis
Basic principles of Chemotherapy-
Drug classification
Drug action side effects
Radiotherapy
Structure of Atom, radio activity and its effect on cell, side effects
Clinical oncology
Hematological cancers
Hematopoiesis
Leukemias and Lymphomas-Classification, Diagnosis, management

Solid tumors- Br. Carcinoma. Hepatomas. MM-Principles of management
Blood component therapy
Bone marrow transplant
Newer Modalities in Therapy and Supportive care
Biologic Response Modifiers
Gene therapy
Stem cell transplant
Newer antibiotics
Nutritional support
Growth factors

17. RADIO DIAGNOSIS

I. **General:-** The importance and scope of different radiological examinations in the diagnosis, treatment and management of various diseases.

II. Newer imaging modalities: Different imaging modalities including the newer imaging techniques – ultrasonography, colour Doppler imaging, colour flow mapping, computed Tomography, MRI, Nuclear imaging, PET and SPECT- basic principles

III. Protocols to be followed while referring for various routine investigations

Barium studies
Ultrasonography
Computed tomography
MRI imaging
Nuclear medicines investigations

IV. Various contrast investigations and contrast materials used in imaging techniques and adverse reactions

V. Interpretations of plain, contrast x rays, ultrasonography, CT, MRI& NM

18. PSYCHIATRY

Objectives

Students are required to identify and understand:

Delirium and dementia : Common causes
Objectives

Students are required to identify and understand :

Delirium and dementia	: Common causes Principles of management of each syndrome
Misuse and dependence on	: Diverse presentations alcohol and drugs Complications : Outcomes of the conditions : Principles of prevention and treatment
Schizophrenia and related (Included acute and chronic and delusional disorders)	: Recognition of disorders disorders Treatment of an acute episode Principles of long term management
Depressive and manic disorders	: Recognition of mania and depressive disorders of all degree of severity : Co- morbidity of depressive and other disorders : Treatment of uncompleted cases
Acute reactions to stress, PTSD and adjustment disorders (including reactions to terminal illness and normal and abnormal grief)	: Recognition of these conditions : Management of uncompleted cases
Anxiety , phobic and obsessional	: Recognition of disorders disorders : treatment of uncomplicated anxiety and obsessional disorders
Somatoform disorders	: How physical symptoms arise without physical pathology : Concepts of conversion disorders : hypochondriasis : Somatoform disorders : Principles of management
Disorders of eating , sleeping	: Clinical presentations psychosexual functions : Principles of management of uncomplicated cases
Personality disorders	: Concepts of personality and personality disorders : Influence on physical and mental illness
Mental retardation	: principles of prevention : Recognition of the most common syndromes : Principles of management
Childhood psychiatric disorders	: Common psychiatric disorders of childhood and adolescence : Principles of management
Old age psychiatric disorders	: Impact of aging on health and psychiatric illness : Recognition and principles of management of psychiatric disorders in the elderly

Suicide	: Assessment of risk
	: Management of potentially suicidal patients and of those recovering from self-harm
Other syndromes	: Dangerousness and the management of potentially violent people
	: Physical abuse of children and adults
Mental health act	

19. DERMATOLOGY / STD

The skin manifestation of various diseases
 Leprosy
 STD
 FIV
 Systemic infections and infestations
 Internal Malignancy
 Drug reactions
 Systemic diseases with skin manifestations
 Psoriasis
 Vitiligo
 Fungal infections
 Lichen planus
 Viral, bacterial infections Cutaneous metastasis Panniculitis

20 OCCUPATIONAL DISEASES

Note: The list of topics given is general guidelines. They are neither comprehensive nor all inclusive

SKILLS TO BE ACQUIRED

List of essential competencies

Clinical Assessment skills. Laboratory diagnostic abilities. Interpretation abilities
 Communication Abilities, and Therapeutic skills.

Skills of history taking

Active and positive listening Empathy.
 Non - verbal communication.

Art of history taking in handicapped individuals like deaf, elderly, aphasics Ascertaining life history and life style.

Tactful elicitation of personal and confidential History.

Carry out meticulous general & systemic examination. Specific areas of examination based on clues in the history. Make a personality assessment.

Information, evaluation skills, (interpretation).

Diagnostic formulation and differential diagnosis.

Evaluate, role of personal and social factors contributing to the patients behavior pattern.

Formulate plan of management which includes referral to a specialist, whenever appropriate.

Information - giving skills

Pass information to promote health.

Explain the implication of diagnosis to patient as well as the family. Inform the patient about beneficial aspects and also potential adverse effects of treatment.

Philosophical approach to life and death.

Reporting skills

Report verbally or in writing or any other media of communication

To medical colleagues. To lay people.

To Non- medical agencies involved in patient care. Promote public education.

Promote skills in case reporting and publication of data.

Treatment skills

Promote compliance with prescribed treatment.

Basic prescribing skills for medical disorders commonly encountered (rational drug prescribing skills.)

Recognize earliest adverse effects of treatment and distinguish them from those of symptoms of illness.

Learning skills

Sustained self directed independent learning. Keeping abreast with advances in medical practice. Internalising the concept of life long learning.

Access to computer usage, including internet browsing.

Critical appraisal of latest and best information and data analysis. Skills of using library facilities (including electronic media)

Team work skills

Co- operative with Medical colleagues, Non medical health care workers, Patient and his family organizations, Community services.

Non Governmental Organisations & General Public. List of clinical, procedural and practical skills

Competency list

Note: Figures shown against the items indicate minimum number.

Key PI=Performs independently, PA= Performs under assistance

Description of competencies	Number
Clinical Assessment Skills (AII PI)	
Elicit a detailed clinical history including Dietary recall, calorie and protein estimation	50
Perform a through physical examination including Anthropometry	10
Optic fundi examination	20
Per rectal examination	05
Procedural skills (AII PI)	
Test dose	05
Sampling for fluid cultures	10
IV – Infusions	20
Intravenous cannulation	10
Venesection	05

Description of competencies	Number
ECG recording	50
Pleural tap	10
Peritoneal tap	10
Pericardio - centesis	05
Lumbar puncture	15
Resuscitation	
BLS	30
ALS	10
Central line, CVP	05
Blood and blood component (platelet, FFP, etc.) transfusions	10
Arterial puncture for ABG	20
Liver biopsy	10
Liver abscess aspiration	05

Bone marrow aspiration and biopsy	10
Peritoneal/ Pleural	2 each
Glucometer usage	30
Urine analysis	20
Urinary Catheterization	15
Ryle's, Stomach tube use	20
Sputum – Gram's / AFB staining	10 each
Respiratory management (AII PI)	
Nebulization	30
Inhaler therapy	30
Oxygen delivery	30
List of PA skills:	
Peritoneal dialysis	05
Haemodialysis	05
Description of competencies	Number
Critically ill person (AII PI skills)	
Monitoring a sick person	50
Endotracheal intubations	20
CPR	10
Using a defibrillator	10
Pulse oximetry	50
Feeding tube use	10
Intercostal tube placement with underwater seal	10
Sedation	10
Analgesia	20
Venesection	
CUP monitoring	
List of PA skills:	
Assessment of brain death	10
Laboratory – Diagnostic Abilities (AII PI) Urine protein, sugar, microscopy	10
Peripheral blood smear	10
Malarial smear	10
Ziehl Neelsen method smear – sputum, gastric aspirate	10
Gram's stain smear – CSF, pus	10
Stool pH, occult blood , microscopy	10
KOH smear	2
Cell count – CSF, pleural, peritoneal, any serous fluid	20

Interpretation Skills (AII PI)

Clinical data (history and examination findings), formulating a differential diagnosis in order of priority, using principles of clinical decision – making, plan investigative workup, keeping in mind the cost – effective approach i.e., problem solving and clinical decision making.

Blood, urine , CSF and fluid investigations – hematology, biochemistry, X-ray chest, abdomen, bone and joints

RCG

Treadmill testing

ABG analysis

CT scan chest and abdomen CT scan head and spine Barium studies IVP, VUR studies

Ultrasound abdomen Pulmonary function tests

Immunological investigations

Echocardiographic studies

Interpretation under supervision (PA)

Description of competencies	Number
Hemodynamic monitoring	10
Handling Ventilators	10
Cardiac pacing	05
GI Endoscopy – Upper	20
Lower	05
Bronchoscopy	05
Tracheostomy	05
U/S abdomen	20
U/S guided aspiration	10
ECHO	20
TMT	20
Nuclear isotope scanning	10
MRI scanning of head / chest	10

To be familiar with

Radio frequency ablation

PTCA & Stent

Peripheral & Carotid Doppler

Peripheral Angioplasty

PFT

Nerve Conduction Studies

5 Interpretation Skills

All Haematological & Biochemical investigations

X-ray of chest, abdomen, bones & joints

Barium studies

ECG Echo TMT

Ultra-sound abdomen

Doppler Studies

CT/MRI of head, chest & abdomen
Immunological studies & Polymerase chain reaction
PFT
EEG/ ENMG

6 Nutritional advice in DM

Obesity/ Malnutrition
Cirrhosis of liver
Renal failure
Hypertension / Ischemic Heart Disease Diarrhoea

7 Principles of Rehabilitation in

Strokes & Neuro degenerative disease
Muscular dystrophies
COPD / Suppurative lung disease
IHD
Epilepsy & Others

Demonstrating professionalism ethical behaviour (humane and professional care of patients), Self directed learning

Utilization of information technology, Medline search, Internet access, Computer usage, Identifying key information sources, literature search, information management

Research methodology – interpretation and presentation of scientific data

8 Therapeutic decision – making

Managing multiple problems simultaneously
Assessing risks, benefits and costs of treatment options
Involving patients in decision – making selecting specific drugs within classes
Rational use of drugs

Training Programme:

To attain proficiency in the subject and to practice the post – graduate student has to be trained in an organised and structured manner. Graded responsibility is to be given to the post – graduate student on a progressive scale in an integrated manner in the three year course with the trainee being able to attain his/ her identity as a physician capable of holistic approach to the patient care. Independent self-directed problem based learning Skill acquisition oriented learning. Ambulatory and Emergency care.

I year

- ☐ Ability to obtain a clear and thorough history, physical examination and follow notes. Capability to manage routine & on call duties of the wards. Supervising are follow up of investigations. Ability to develop a rational treatment plan. Initiate carry out treatment. Identify emergency problems, seek help from seniors & initiate treatment so as to develop decision making and judgment skills.
- ☐ Supervise house – surgeon’s work.
- ☐ To prepare synopsis for dissertation

II year

- ☐ Develop basic knowledge of the specialty subject in the care of the patient.
- ☐ Witness/ perform procedures in the specialty.
- ☐ Learn the indications and contraindications of the procedures.
- ☐ To learn when to refer a case to the sub- specialist.
- ☐ To know when to intervene and when not to intervene in a case
- ☐ To carry out data collection for the dissertation.

III year

- ☐ Able to handle case independently- diagnose and manage the cases in the unit /ward.
- ☐ Diagnose and treat cases in emergency & ICU set up.
- ☐ Problem identification of referral cases & advice suitably. Supervise I yr post – graduate students
- ☐ Teach interns
- ☐ Teach undergraduates
- ☐ Help junior residents in his responsibilities in all levels and to intervene a appropriate time when the occasions demand.
- ☐ In problem cases, to seek help from senior staff members.
- ☐ Successfully complete data collection, analysis and writing up and submission of dissertation.

ROTATION POSTINGS

General Guidelines

(a) Where all departments of sub – specialties are available:

Department	Duration of posting	Year of posting
General Medicine	24 months	I/III
Emergency	2 months	II
I.C.U.	1month	II
Cardiology including ICCU	2 months	II
Neurology	1 month	II
Gastroentrology	1 month	II
Respiratory Diseases	1 month	II
Nephrology	1 month	II
Endocrinology	15 days	II
Skin	15 days	II
Psychiatry	15 days	II

(b) Where separate sub- specialties are NOT available:

Minimum 4 months in Emergency and 1 month in ICU. If any sub-specialty is available, the duration of posting in the department shall be as in item 1. The rest of the training will be in the department of Medicine but the specialist shall ensure:

- i) Adequate exposure to cases of sub-specialties.
- ii) A minimum exposure to the following procedures :

Department	No. of Procedures
Cardiology	5
Gastroenterology	5
Respiratory Medicine	10
Neurology	10
Nephrology- Haemo dialysis and	
Peritoneal dialysis	5 each

TMT	5
Holter	5
Upper GI Endoscopy	10
Colonoscopy	3
Sigmoidoscopy	3
Bronchoscopy	2
Pleural biopsy	2
EMG	2
EEG	5
Muscle biopsy	2
Peritoneal dialysis	5
Haemo dialysis	5

iii) In addition, a minimum number of cases of the following sub – specialties must be seen and entered in the log book:

Psychiatry	-	10
Dermatology	-	10
Endocrinology	-	5

Course Outcomes:

Course I: Basic Sciences, Physiology, Fluid & Electrolyte balance, Toxicology and Emergency Medicine (Course: U19MDGM01)

CO1: Application of basic science knowledge in the practice of general medicine.

CO2: The competency to diagnose and manage electrolyte disturbances.

CO3: Ability to diagnose and manage common poisons.

CO4: Competency to manage common medical emergencies.

GENERAL MEDICINE TOPICS

Genetics: Basic principles of genetics, molecular basis of cancer, genetics and genetic engineering, human genome mapping, chromosomal disorders, genetic basis of cancer, genetic and gene therapy.

Immunology- basics in immunology, **Auto immune disorders, immuno deficiency diseases, hypersensitivity reactions-** anaphylaxis, angioedema, adverse drug reactions, Complement, HLA system. Transplantation immunology.

Fluid and electrolyte balance/Acid – base metabolism – The body fluid compartments, metabolism of water and electrolytes, factors maintaining homeostasis, diagnosis and management of acidosis and alkalosis & **Electrolyte imbalance**

Blood transfusion: - Blood grouping, cross matching, component therapy, complication of blood transfusion, blood substitutes,

Shock and multi - organ Failure:- Types of shock, diagnosis, resuscitation pharmacological support, ARDS, ventilator support and its prevention.

Nutrition:- RDA of nutritional substances, nutritional assessment, nutritional recall, metabolic response to stress, malnutrition, PCM, nutritional deficiency states, nutritional response in stress, enteral and parental nutrition, dietary advice in obesity, DM renal , hepatic failure, hyperlipidaemia, IHD.

Poisoning:- OP compound, sedatives, alcohol, corrosives, anti-convulsants, general principles of management and specific management of poisons including snakes bites, scorpion stings.

Toxicology – Heavy metal poisoning, Fluorosis, Lathyrism
Pre anesthetic and postoperative medical problems
Geriatric medicines
Pregnancy medicine
Adolescent medicine

Course II: Infections, Tropical Medicine, CVS, GIT and other systems (Course: U19MDGM02)

CO1: Ability to diagnose and manage common infections and PUO.

CO2: Emergency management of MI.

CO3: Management of lifestyle diseases and diseases affecting organ systems.

GASTRO INTESTINAL & HEPATOBILIARY SYSTEM

Diseases of Oesophagus

Peptic ulcer diseases and its management

Upper gastrointestinal bleed

Lower gastrointestinal bleed

Approach to Mal-absorption and mal-digestion

Inflammatory bowel diseases

Irritable bowel syndrome (I.B.S). Gastrointestinal motility disorders

Chronic Diarrhoea Disorders of peritoneum G I function tests

INFECTIOUS DISEASES

Basic considerations: Host – parasite interaction, Immunization principles, Lab. Diagnosis of infectious diseases, vaccination (BCG, Typhoid, Tetanus, Hepatitis A & B), Antimicrobial agents, Mol. **Mechanism of microbial pathogenesis**. Clinical syndromes, (community setting): - Septic shock, Infective endocarditis, PUO, infectious diarrhoea, Bacterial food poisoning, Common STD syndromes, inf. Complications of bites and stings, infections of skin, muscle, and soft tissue, Osteomyelitis, Infra-abdominal infections and abscess, P.I.D Nosocomial Infections: **Hospital acquired infection, infections in Transplantpts, Infection control in hospital.**

Bacterial infections: Pneumococcal, staphylococcal, streptococcal& Enterococcal, Tetanus, Diphtheri, Anthrax, Listeria, Gas gangrene, Botulism, other clostridial infections.

Meningococcal, H.pylori, salmonella, shigella, cholera, legionella, moraxella Brucella, Pseudomonas, Mixed anaerobic infections, H. influenza, Gonococcal, Pertussis, Plague, Campylobacter, Donovanosis, Actinomucosis.

Anaerobic infections

Mycobacterial diseases: Tuberculosis, Leprosy, Non-tubercular mycobacterium, Spirochaetal: Syphilis, Leptospirosis, Endemic trepanomatosi.

Rickettsiae: R M spotted fevers

Mycoplasma: M. pneumoniae

Chlamydia : psittacosis

Fungal Infections: Candidiasis, P. carinii, Aspergillosis, Mucor mycosis Coccidioidomycosis, Cryptococcosis, Histoplasmosis.

Viral Infections: Anti viral chemotherapy

DNA viruses: Herpes simplex, CMV, Chicken pox varicella, other poxviruses. Varicella zoster, parvovirus

Ebstein Barr, HPV

DNA & RNA respiratory viruses: Influenza

RNA viruses: Rabies, ARBO viruses (Dengue, KFD, Japanese encephalitis), Human retrovirus, Enteroviruses, Rubella.

HIV & AIDS: - Epidemiology, clinical stages, complications, opportunistic infections (OI), laboratory investigations, HAART, PEP & counseling.

Protozoal and Helminthic infections: - Life history, clinical manifestations, lab diagnosis and therapy, Amoebiasis, Malaria, Giardiasis, Taeniasis, Echinococcosis, Evermicularis, T. trichiura, Ascariasis, Hookworm infections, Filariasis, leishmaniasis, other free living amoeba Toxoplasmosis, Trichinella, Trypanosomiasis, Trichomoniasis, H.nana, D latum, Schistosomiasis, Larva Migrans syndrome.

CARDIO VASCULAR DISEASES

Rheumatic fever and heart diseases Mycobacterial diseases: Tuberculosis, Leprosy, Non-tubercular

Congenital heart diseases

Atherosclerosis, coronary artery disease

Primary and secondary hypertension

Cardiac Failure

Cardiac arrhythmias – tachy and brady arrhythmias, heart blocks

Infective endocarditis

Myocardial and Pericardial diseases

Pregnancy and heart diseases

Diseases of aorta

DVT and pulmonary embolism

Peripheral arterial and venous diseases

Acute and Chronic cor pulmonale

Disease of Lymphatic system

Non-cardiac surgery in cardiac patients- assessment of anaesthesia and surgery

Cardiac drug and drug interaction

Guidelines published by standard cardiology journals.

Apart from pathophysiology, clinical features and management, the importance of primary and secondary prevention must be stressed.

Clinical cardiology

- * Adequate exposure to cardiac OPD work, cardiology ward work and coronary care unit.
- * One month in cardiac OPD/Ward, and one month in CCU
- * During the posting, the student should accompany his cases for stress – ECG (TMT), echocardiography and cath lab.

Course III Respiratory Medicine, Central Nervous System & Rheumatology (Course: U19MDGM03)

CO1: Ability to diagnose and manage common causes of respiratory failure (COPD, Bronchial asthma)

CO2: Ability to diagnose and manage meningitis and vasculitis presenting with multi organ affections

CO3: Competency to diagnose and manage polyarthritis.

RESPIRATORY MEDICINE:

Applied aspects of Respiratory system & Respiratory Physiology.

Mycobacteriology: Diagnostic methods, pathogenesis of Mycobacterial diseases their clinical manifestations. Pulmonary and extra pulmonary as well as disseminated Tuberculosis, its pathogenesis, clinical features diagnosis and management, **National programme on Tuberculosis including DOTS.**

Non Tuberculosis Respiratory infection:

Community and hospital acquired pneumonias, infections of tracheo-bronch tree including cystic, fibrosis, parasitic and fungal diseases of lungs, HIV infections and lungs.

Allergic diseases of respiratory system including bronchial asthma.

Industrial, occupational lung diseases including Interstitial Pulmonary Fibrosis

Suppurative lung diseases

Granulomatous diseases of lung including sarcoidosis.

Pulmonary manifestations of systemic diseases and drug induced lung diseases.

Tropical pulmonary eosinophilia

Diseases of pleura, mediastinum and diaphragm.

Intra- thoracic malignancies including etiology, diagnosis, staging and management of lung cancer.

Sarcoidosis

NERVOUS SYSTEM

Applied aspects of anatomy – Brain and spinal cord

Evaluation of CNS diseases

Glasgow coma scale(GCS) and AVPU scale

Clinical approach to:- Coma, head ache, seizure, Dementia, Aphasia, sleep disorders

Brain death

Cerebrovascular diseases

Cranial nerve disorders

CNS infection, Bacterial Viral, Fungal, Neurotuberculosis, parasitic

Prion diseases

Motor system diseases

Tumors of brain and Spinal cord Extra pyramidal disorders Cerebellar disorders

Demyelinating diseases

Neuro-degenerative disorders Nutritional

Autoimmune encephalitis
Peripheral Neuropathies, polyneuropathies & Guillain Barre Syndrome
Neurologic manifestations of systemic diseases
Cervical spondylosis
Phacomatosis
Disorders of muscle-Dystrophy, Myopathic syndrome

RHEUMATOLOGY AND CONNECTIVE TISSUE DISORDERS

Structure of connective tissue- collagen, elastin and proteoglycans
Immunological mechanism and Immunogen in Rheumatoid arthritis
SLE
Osteoarthritis
Vasculitis
Sero negative spondyloarthropathy
Crystal arthritis
Inflammatory/metabolic myopathies Arthropathies associated with Endocrine diseases
Haematologic diseases malignant diseases Fibromyalgic syndromes
Lower back pain
Systemic sclerosis
Myositis
Mixed connective Tissue disorder (MCTD)

Course IV Nephrology, Endocrinology, Hematology, Oncology & Recent Advances in Medicine (Course: U19MDGM04)

CO1: Competency to manage acute renal failure, especially following infections & sepsis

CO2: Ability to identify the etiology of pancytopenia or anemia

CO3: Diagnose and manage DM and its complications

ENDOCRINOLOGY & METABOLISM

Principles of Endocrinology: Mechanism of action of hormones and receptors
Assessment of endocrine function

Hypothalamus & Pituitary: Approach to pituitary diseases, diseases of anterior and posterior- pituitary tumors, Acromegaly, short stature, prolactinoma, diabetes, insipidus, SIADH, Cushing's disease, Panhypopituitarism, Sheehan's syndrome, Non secretory adenoma.

Pancreas: Hypoglycemia, Insulinoma,

Diabetes Mellitus: Prevalence, Etiopathogenesis, ADA criteria for diagnosis; ADA classification, Clinical features, investigations, complications- micro & macro –vascular, management-Diet, Exercise, oral hypoglycemics, **Insulin therapy in Type 1 and type 2, Gestational diabetes, Diabetic keto-acidosis, HONK, Hypoglycemia**

Recombinant insulin

Principle of islet transplantation

Diabetes and pediatric age group

Thyroid: Iodine metabolism, Iodine deficiency disorder, Synthesis and secretion of thyroid hormone, hypothyroidism, hyper thyroidism, Cretinism, Sick euthyroid syndrome, thyroiditis, evaluations of nodule, ca. thyroid.

Parathyroid: Primary hyperparathyroidism, hypoparathyroidism Tetra Pseudohypoparathyroidism.

Adrenal: Steroid biochemistry, Addison's disease, Cushing's syndrome, Congenital adrenal hyperplasia, Pheochromocytoma, Primary aldosteronism. Gonads:- testes . Men – Hypogonadism – PGAS, Hypogonadotropic (Kallman's Syndrome) Hypergonadotropic (Klinefelter's syndrome), delayed puberty, puberty precocious, puberty infertility.

Ovary: delayed puberty – Turner's syndrome, polycystic ovarian diseases, hirsutism, precocious puberty, approach to amenorrhea, postmenopausal syndrome, current concepts in management.

SEXUAL MEDICINE:

Applied aspect of anatomy and physiology of reproductive system- male and female. Human sexual response.

Etiology: **Clinical features and management of common sexual problems – male and female.**

Effect of psychiatric illness and systemic diseases including commonly used drugs on reproductive system.

Infertility – male & female- etiology, clinical features, investigations and physicians role in management.

METABOLIC BONE DISORDER (MBD)

Bone mineral, metabolism, osteoporosis
Osteomalacia & rickets
Carcinoid tumors, hyperlipidemia

NEPHROLOGY

Evaluation of patient with renal diseases

Interpretation of laboratory tests
Acute renal failure
Pathogenesis, pathology, clinical features
Conservative management

Diet in renal failure
Acute glomerulonephritis including idiopathic GN Nephrotic syndrome
Urinary tract infection
Drugs and kidney
Nephrolithiasis and obstructive disorder Renal involvement in systemic diseases Diabetic nephropathy
Pregnancy and kidney
Basics of renal transplantation
Organ donation
Concept of brain death and cadaveric transplantation
Electrolyte disturbance and its management
Immuno - suppressive drugs
Slow continuous renal replacement therapy

HAEMATOLOGY

Haematopoiesis
Anaemias- causes, clinical features and laboratory approach and treatment
Iron deficiency, magaloblastic, haemolytic and aplastic anaemias.
Various thalasemic syndromes, Hb electrophoresis, Polycythaemias
Problem of iron overload
Autoimmune blood disorders
Transfusion medicine
Recognition and management of transfusion disorders
Transfusion in patients with Haematological diseases (Component therapy) Coagulopathy
Hyper coagulable state
Leukaemias an its managements
Myelodysplastic syndromes and myeloproliferative disorders
Platelets disorders- Purpuras- Primary and secondary. Therapeutic plasmapheresis and cytaparesis,
ABVP, CHOP Chemotherapy

MEDICAL ONCOLOGY

Basics of oncology
Normal cell, Cancer cell- Cell cycle and its Regulation
Molecular Biology Techniques such as Southern blot, Northern blot, western blot, Karyotyping, FISH, PCR
Metastatic cascade
Angeogenesis
Basic principles of Chemotherapy-
Drug classification
Drug action side effects
Radiotherapy
Structure of Atom, radio activity and its effect on cell, side effects

Clinical oncology
Hematological cancers
Hematopoiesis
Leukemias and Lymphomas-Classification, Diagnosis, management
Solid tumors- Br. Carcinoma. Hepatomas. MM-Principles of management
Blood component therapy
Bone marrow transplant
Newer Modalities in Therapy and Supportive care
Biologic Response Modifiers
Gene therapy
Stem cell transplant
Newer antibiotics
Nutritional support
Growth factors

Soft Skills – Elective Course

CO1: The ability to plan and execute a research work.

CO2: Aquisition of skills of teaching

CO3: Ability to work as a member of a healthcare team.

CO4: Competency to provide healthcare in emergency situations such as natural calamities.

CO5: Ability to communicate with the patients and caregivers.

Infections diseases, HIV and AIDS, Cardiovascular diseases, Gastro Intestinal and Hepatobiliary system, Diseases and Disorders of Pancreas, Tropical Diseases.

Paper - III Respiratory Medicine, Central Nervous System & Rheumatology:

Paper – IV – Nephrology, Endocrinology and Metabolism, Hematology, Medical Oncology, Psychiatry, Dermatology, STD, Occupational Diseases

Scheme of Examination

M.D. Degree examination in General Medicine shall consist of dissertation, written papers (Theory), Practical / Clinical and Viva voce.

Dissertation: Every candidate shall submit a dissertation as indicated in Chapter I, Sl. NO. 9. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

A. Written Papers (Theory)

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions, each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100.

Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows*:

Paper: I Basic Sciences

Applied aspects of Anatomy, Physiology, Biochemistry, Pathology, Microbiology, Pharmacology, General Medical Topics, Genetics, Immunology, Fluid & Electrolyte balance, Blood transfusion, Shock and Multiorgan failure, Nutrition, Poisoning, Geriatrics Medicine, Pregnancy Medicine, Adolescent medicine, Toxicology, Pre anaesthetic and post operative medical problems, Emergency Medicine, Radiodiagnosis.

Paper: II

Infections diseases, HIV and AIDS, Cardiovascular diseases, Gastro Intestinal and Hepatobiliary system, Diseases and Disorders of Pancreas, Tropical Diseases.

Paper - III – Respiratory Medicine, Central Nervous system, Rheumatology and Connective Tissue Disorders, Sexual Medicine, Metabolic Bone Disorders

Paper – IV – Nephrology, Endocrinology and Metabolism, Hematology, Medical Oncology, Psychiatry, Dermatology, STD, Occupational Diseases

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.

B. Clinical Examination

It should aim at examining skills and competence of candidate for undertaking independent work as a specialist. Each candidate should examine:

One Long Case = 65 marks (time - 45 minutes)

Three Short Cases = 45 marks (time – 30 minutes for each case)

C. Viva Voice Examination

Marks 100

1) viva – voice Examination: (80 marks)

All examiners will conduct viva – voice conjointly on candidates comprehension analytical approach, expression and interpretation of data. It includes all components of course contents. In addition candidates may be also be given case reports, ECGs, charts, gross specimens, Histopathology slides, x- rays, ultrasound, CT scan images, etc., for interpretation. Questions on use of instruments will be asked. It includes discussions on dissertation.

2) Pedagogy Exercise (Teaching skills): (20 marks)

A topic be given to each candidate in advance. He/ she asked to make a presentation on the topic for 8-10 minutes and assessed.

D) Maximum marks

Theory	Practical	Viva	Grand Total
400	200	100	700

RECOMMENDED BOOKS & JOURNALS:**TEXT BOOKS:**

1. DAVIDSON'S Principles and practice of MEDICINE: Christopher Haslett, Edwin R. Chilvers, Nicholas A. Boon, Nicki R Colledge; 19th Edition; 2002 CHURCHILL LIVINGSTONE.
2. Kumar and Clark Clinical MEDICINE: Parveen Kumar, Michel Clark; 5th edition; 2002: W.B. SAUNDERS.
3. OXFORD TEXT BOOK OF MEDICINE; D.J. Weatherall, J.G.G. Ledingham, D.A. Warrell; 3rd Edition I, II, III volumes; 1996; OXFORD MEDICAL PUBLICATIONS.
4. Manson's TROPICAL DISEASES; Gordon cook; 20th Edition 1996: Indian Reprint 2001; Saunders / Harcourt India.
5. CECIL TEXT BOOK OF MEDICINE; Lee Goldman, J. Claude Bennett: 21st Edition volume 1 and volume 2; First Indian Print 2001; Harcourt Asia. Saunders.
6. HARRISON'S PRINCIPLES OF INTERNAL MEDICINE; EUGEN BRAUNWALD, ANTHONYS. FAUCI, DENNIS L. KASPER, STEPHEN L HAUSPER, DAN. L. LONGO, J.LARRY JAMESON; 15th Edition; volume 1 and volume 2; 2001; Mc. Graw Hill.
7. Manual of Practical Medicine; R. Alagappan; 2nd Edition; 2002; JAYPEE.
8. API Text Book of MEDICINE; SIDDARTH N. SHAH, M. Paul Anand; 7th Edition; 2003; The Association of Physicians of India.
9. Physical Diagnosis. Rustom Jal Vakil: A Text Book of symptoms and physical signs 10th edition (2004)

REFERENCE: CARDIOLOGY:

1. HURST'S THE HEART; VALENTIN FUSTER, R. WAYNE ALEXANDER, ROBERT A. O'ROURKE; 10th edition – 2001, Volume 1 and 2; Mc Graw Hill.
2. PERLOFF THE CLINICAL RECOGNITION OF CONGENITAL HEART DISEASE; JOSEPH K. PERLOFF; 4th Edition; 1994; HARCOURT BRACE'SAUNDERS.
3. CLINICAL ELECTRO CARDIOGRAPHY; A simplified Approach; Aryl L. Goldberger; 6th Edition; 1999; Mosby. Elsevier India.

4. Leo Schamroth: An introduction to Electrocardiography; Colin Schamroth; 7th Editions 1990; Blackwell Science.
5. BRAUNWALD Heart disease; A text book of Cardiovascular Medicine EUGENE BRAUNWALD 6th Edition; 2001; HARCOURT T BRACE ASIA SAUNDERS.
6. MARRIOTT'S Practical Electrocardiography; Galen S. Wagner; 10th Edition; Lippincott Williams and Wilkins.

ENDOCRINOLOGY:

1. Degroot Jameson ENDOCRINOLOGY; Leslie J. De groot, J. Larry Jameson; 4th Edition; 2001; Volume 1, Volume 2 and Volume 3; SAUNDERS.
2. WILLIAMS TEXT BOOK OF ENDOCRINOLOGY; Jean D. Wilson, Daniel W. Fasting & Henry M. Kronenberg, P. Reed Larsen; 9th Edition; 1998; Saunders.

GASTROENTROLOGY

1. Sleisenger and Fordtran's Gastrointestinal and Liver Disease; Pathophysiology/ Diagnosis/ Management; Mark Feldman, Bruce F Schorshmidt, Marvin H. Slusenger; 6th Edition; volume 1 and 2; 1998; SAUNDERS.
2. TEXT BOOK OF GASTROENTROLOGY; TADATAKA YAMADA, DAVID H. ALPERS, LORER LAINE, CHONG OWYANG DON W. POWELL; 3rd Edition 1999; Lippincott Williams and Wilkins.
3. Bockus GASTROENTROLOGY; J. EDWARD BERK; Haubrich, Kalser, Roth, Schaffner; 4th Edition; Volume 1-7; 1985; Saunders.
4. Oxford Text Book of Clinical Hepatology; Neil McIntyre, Jean – Pierie Benhamou, Johannes Bircher, Mario Rizzetto, Juan Roder; 1991; Volume 1-2; Oxford Medical Publications.
5. Diseases of the Liver and Biliary System; SHEILA SHERLOCK, JAMES DOOLEY; 11th Edition; 2002; Blackwell Science.

HAEMATOLOGY

1. Text book of HAEMATOLOGY: Shirlyn B. Mekenrie; 2nd Edition; 1996: Williams and Wilkins.
2. Wintrobe's clinical haematology: G. Richard Lee, John Foerster, John Lukens, Frixon Paraskevas, John P. Greer, George M. Rodgers; 10th Editions; 1999: Volume 1 and Volume 2; Lippincott, Williams and Wilkins.
3. Haematology; William J. Williams, Ernest Beutler, Allan J. Erdev, Marihall A. Lechtman; 4th Edition; 1991; Mc Graw Hill.
4. WILLIAMS HEMATOLOGY; Ernest Beutler, Marshall A. Lichtman, Barry S. Collier, Thomas J. Kipps, Uri Seligsohn; 6th Edition; 2001: Mc. Graw Hill.

RHEUMATOLOGY:

1. Pathological basis of the Connective Disease; Dugald Lindsay Gardner; 1992; Edward Arnold.
2. OXFORD TEXT BOOK OF RHEUMATOLOGY: P.J. Maddison, David A. Isenberg, Patricia Wod, David N. Glass; 1993; Volume 1-2; OXFORD MEDICAL PUBLICATIONS.
3. Manual of Rheumatology: P.K. PISPATI, NE, BORGES, M.Y. NADKAR; 2nd Edition.

NEUROLOGY:

1. Brain's disease of the Nervous System: Micheal Donaghy; 11th Edition; 2001 OXFORD.
2. Neurology in clinical Practice; Principles of Diagnosis and Management; Walter G. Bradley, Robert B. Daroff, Gerald M. Fenichel, C. David Marsden; 3rd Edition; 2000, Volume 1 and Volume 2; B/H Butterworth – Heinemann.
3. Principles of Neurology; Raymond D. Adams, Maurice Victor, Allan H. Ropper; 7th Edition; 2002; Mc Graw Hill.
4. Bickerstaff's Neurological Examination clinical practice: John spillane; 6th Edition 1996; Indian Reprint 2002; Blackwell science.
5. DEJONG'S THE NEUROLOGIC EXAMINATION; A.F. Haerer 5th Edition; Lippincott – Raven
6. JOHN PATTEN Neurological Differential Diagnosis; John patten; 2nd Edition; 2001; Springer.
7. Merritt's Neurology 10th Edition, Lewis P. Rowland.
8. TEXT BOOK OF NEUROLOGY; Jagjit S. Chopra, G. Arjundas, S. Prabhakar 2001; 1st Edition: B.I. Churchill Livingstone.
9. JOHN PATTEN Neurological differential diagnosis 2nd Edition.
10. Bickerstaff's Neurological examination in clinical practice, 6th Edition (2002)

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1. OXFORD TEXT BOOK OF CLINICAL NEPHROLOGY; STEWAR CAMERON, ALEX M. DAVISON, JEAN – PIERRE GRINFELD, DAVID KERR, EBERHARD RITZ; 1992; VOLUME 1-3; OXFORD MEDICAL PUBLICATIONS .
2. THE KIDNEY; BRENNER AND RECTOR; 3rd Edition; 1986; Volume 1-2 Saunders.

ONCOLOGY:

1. CANCER Principles and Practice of Oncology; Vincent T. Devita, Jr. Samuel Hellman, Steven A. Rosenberg; 5th Edition; 1997; Lippincott – Raven.
2. OXFORD TEXT BOOK OF ONCOLOGY; Micheal Peckham, Herbert M. Pinelo, Umbuto Veronesi; 1995; Volume 1-2; OXFORD Medical Publications.
3. Clinical Oncology; Martin D. Abeloff, James O. Armitage, Allen S. Lichter, John E. Niederhuber; 1995; Churchill Livingstone.

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1. CROFTON AND DOUGLAS'S RESPIRATORY DISEASE; Anthony Seaton, Douglas Seaton, A. Gordon Leitch; 5th Edition; Volume 1-2; 2000; Blackwell Science.
2. TEXT BOOK OF CRITICAL CARE: Shoemaker, Ayres, Grenvik, Holbrook; 4th Edition; Book I & Book II; 2000; Harcourt Asia. Saunders.
3. CORE TEXT BOOK OF RESPIRATORY CARE PRACTICE: THOMAS A. BARNES; 2nd Edition; 1994; Mosby.
4. Clinical procedures in Emergency Medicine: James R. Roberts, Jerris B. Hedges; 2nd Edition; 1991; Saunders.
5. Emergency Medicine; Howell; Attieri, Jogoda, Prescott, Scott, Stair; 1998; Volume 1-2; Saunders.
6. Text Book of Tuberculosis; K.N. Rao; 2nd Edition; 1981; Vikas Publishing House Pvt. Ltd.
7. TUBERCULOSIS: S.K. Sharma. A. Mohan; 1st Edition; 2001; Jaypee.

CLINICAL METHODS:

1. Hutchisons Clinical Methods; Micheal Swash; 21st Edition; 2002; Saunders/
2. MACHLEOD'S Clinical Examination: Joh F. Munro, Jan W. Campbell, 10th Editions: 2000; Churchill Livingstone.
3. CHAMBERLAIN'S Symptoms and Signs in clinical medicine; An Introduction to medical diagnosis: Colin Ogilvie, Christopher C. Evans; 12th Edition; 1997; sounders.
4. Physical Diagnosis; A text book of Symptoms and physical signs; 9th Edition; 2001; Media Promoter and publishing Pvt. Ltd.

INFECTIOUS DISEASES:

1. Tropical Infectives diseases: Principles, Pathogenes & Practice: Richard L. Guerrart, David H. Waller, Peter F. Weller; 1999; Volume 1-2; Churchill Livingstones.
2. HUNTER'S TROPICAL MEDICINE and Emerging Infectious Diseases: G. Thomas Strickland; 8th Electim; 2000; Saunders.

DIABETOLOGY:

1. JOSLINE'S DIABETES MELLITUS: C. Ronald Kahn, Gordon C. Weri; 1994; Reprint 1998; 13th Edition: Waverly.
2. TEXT BOOK OF DIABETES: John Pickup; Gareth Williams; Ist Edition; 1991; Volume 1-2: Black well Scientific Publication.
3. Diabetes Mellites in Developing Countries; J.S. Bajaj; Ist Edition 1984; Re-print.
4. RSSDI Text book of diabetic mellitus 2002, MMS Ahuja, BB Tripathy, Sam GP Moses, H B Chandalia, A K Das, P V Rao, S V Madhu

JOURNALS

1. American Journal of Cardiology
2. Annals of National Academy of Medical Sciences
3. Heart (Formerly British Heart Journal)
4. Indian Journal of Tuberculosis Chest diseases
5. Indian Heart Journal
6. Indian Practitioner
7. Journal of Association of Physicians of Indians
8. New England Journal of Medicine
9. Post Graduate Medicine
10. American Journal of Medicine
11. Medicine Clinics of North America
12. British Medical Journal
13. American Journal of Respiratory Diseases
14. Diabetes care
15. Annals of Neurology
16. Indian Journal of Nephrology
17. Lancet

Chapter IV

Monitoring Learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model Checklists are given in this Chapter which may be copied and used.

The learning out comes to be assessed should included: (i) Personal Attitudes, (ii) Acquisition of knowledge, (iii) Clinical and operative skills, and (iv) Teaching skills.

i) *Personal Attitudes.* The essential items are:

- Caring attitudes
- Initiative
- Organisational ability
- Potential to cope with stressful situations and undertake responsibility

- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Acquisition of Knowledge: The methods used comprise of 'Log Book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in dept. study, presentation skills, and use of audio – visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study presentation skills and use of audio visual aids are to be assessed using a checklist (see Model Checklist II, Chapter IV)

Clinico- pathological conferences : This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a checklist similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in the assessment.

iii) Clinical Skills

Day to Day work : Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV)

Clinical Meetings : Candidates should periodically present cases to his peers and faculty members. This should be assessed using a checklist (see Model Checklist IV, Chapter IV)

Clinical and Procedural Skills : The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student log book. (Table No. 3, Chapter IV)

iv) Teaching Skills

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students. (see Model Checklist V, Chapter IV)

v) Periodic Tests

Three tests may conducted, two of them be annual test, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

- vii) Work diary / Log book- Every candidate shall maintain work diary and record his / her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.
- viii) *Records*: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log Book

The logbook is a record of the important activities of the candidates during his training, Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1, 2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the department committee may recommend that defaulting candidate be withheld from appearing the examination, if she/ he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

CHAPTER IV (contd.)
Format of Model Check Lists
Check list – 1, MODEL CHECK-LIST FOR EVALUATION OF
JOURNAL REVIEW PRESENTATIONS

Name of the student:

Name of the faculty / Observer:

date:

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Article chosen was					
2	Extent of understanding of scope & Objectives of the paper of the candidate					
3	Whether cross reference has been consulted					
4	Whether other relevant publications consulted					
5	Ability to respond to questions on the paper / subject					
6	Audio – Visual aids used					
7	Ability to defend the paper					
8	Clarity of presentation					
9	Any other observation					
	Total Score					

CHAPTER IV (contd.)
Format of model check lists
Check list – II MODEL CHECK-LIST FOR EVALUATION OF
SEMINAR PRESENTATIONS

Name of the student:

Name of the faculty / Observer:

date

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Whether other relevant publications Consulted					
2	Whether cross references Have been consulted					
3	Completeness of the Preparation					
4	Clarity of Presentation					
5	Understanding the subject					
6	Ability to answer the questions					
7	Time Scheduling					
8	Appropriate use of Audio – Visual aids					
9	Overall Performance					
10	Any other Observation					
	Total Score					

CHAPTER IV (contd.)
Format of model check lists

**Check list –111 , MODEL CHECK-LIST FOR EVALUATION OF
CLINICAL WORK IN WARD/OPD**

Name of the student:

Name of the faculty / Observer:

date

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Regularity of attendance					
2	Punctuality					
3	Interaction with Colleagues And Supporting staff					
4	Maintenance of case records					
5	Presentation of cases during rounds					
6	Investigations work up					
7	Bedside Manners					
8	Rapport with patients					
9	Counseling Patient's relatives for blood donation or Postmortem and Case follow up.					
10	Over all quality of clinical work					
	Total Score					

CHECK LIST – IV

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the student:

Name of the faculty / Observer:

date

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Completeness of history					
2	Whether all relevant points elicited					
3	Clarity of presentation					
4	Logical order					
5	Mention all positive and negative points of importance					
6	Accuracy of general physical examinations					
7	Whether all physical signs elicited correctly					
8	Whether any major signs missed or misinterpreted					
9	Whether it follows logically from history and findings					
10	Investigations required • Complete test • Relevant order • Interpretation of investigations					
11	Ability to react to questioning whether it follows logically from history and findings					
12	Ability to defend diagnosis					
13	Ability to justify differential diagnosis					
14	Others					
	Grand Total					

CHECK LIST – V

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

Name of faculty / Observer:

Sl No.		Strong point	Weak point
1	Communication of the purpose of the talk		
2	Evokes audience interest in the subject		
3	The Introduction		
4	The sequence of ideas		
5	The use of practical examples and /or illustrations		
6	Speaking style (clear, monotonous, etc. specify)		
7	Attempts audience participation		
8	Summary of the main points at the end		
9	Ask questions		
10	Answer questions asked by the audience		
11	Rapport of the speaker with his audience		
12	Effectiveness of the talk		
13	Uses of AV aids appropriately		

CHECK LIST – VI

MODEL CHECK LIST FOR DISERTATION PRESENTATION

Name:

Faculty / Observer:

Date:

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Interest shown in selecting topic					
2	Appropriate review of literature					
3	Discussion with Guide and faculty					
4	Quality of protocol					
5	Preparation of Proforma					
	Total Score					

CHECK LIST – VII

MODEL CHECK LIST FOR DISERTATION PRESENTATION

Name:

Faculty / Observer:

Date:

Sl No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Periodic consultation with Guide/ Co-Guide					
2	Regular collection of case material					
3	Depth of analysis/Discussion					
4	Department Presentations findings					
5	Quality of final output					
6	Others					
	Total Score					

LOG BOOK

Table 1: Academic activities attended

Name:

Admission year:

College:

Date	Type of activity Specify Seminar, Journal club, Presentation, UG teaching	Particulars

LOG BOOK

Table 2: Academic Presentations made by the students

Name:

Admission year:

College:

Date	Topic	Type of activity Specify Seminar, Journal club, Presentation, UG teaching

LOG BOOK

Table 3: Diagnostic and Operative procedures performed

Name:

Admission year:

College:

Date	Name	I D No.	Procedure	Category O, A, PA, PI*

Key:

- O – Washed up and observed
- A – Assisted a more senior surgeon
- PA – Performed procedure under the direct supervision of a senior surgeon
- PI - Performed independently

Model Overall Assessment sheet

Name of the college:

Academic Year:

Sl No.	Particulars	Name of the student and Mean score									
		A*	B*	C*	D*	E*	F*	G*	H*	I*	J*
1	Journal Review Presentations										
2	Seminars										
3	Clinical work in wards										
4	Clinical presentation										
5	Teaching skill practice										
	Total Score										

Note: Use separate sheet for each year.

Signature of the HOD:

Signature of the Principal:

The above overall assessment sheet used along with the logbook should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

KEY:

Mean Score: Is the sum of all the score of checklists 1 to 7.

A.B..... : Name of the trainees.

CHAPTER V

MEDICAL ETHICS

Sensitisation and practice

Introduction

There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with a many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (1) The General Objective, (2) Stated in chapter II, and develop human values, it is urged that **ethical sensitisation** be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentations, bedside rounds and academic post graduate programmes.

Course contents²⁰

1. Introduction to *Medical Ethics*
 - What is Ethics
 - What are values and norms
 - Relationship between being ethical and human fulfillment
 - How to form a value system in one's personal and professional life
 - Heteronomous Ethics and Autonomous Ethics
 - Freedom and personal Responsibilities
2. Definition of Medical Ethics
 - Difference between medical ethics and bio- ethics
 - Major principles of Medical Ethics

Beneficence	=	Fraternity
Justice	=	Equality
Self determination (autonomy)	=	Liberty
3. Perceptive of medical ethics
 - The Hippocratic oath, the Declaration of Helsinki, WHO, Declaration of Geneva, International Court of Medical Ethics (1993)
 - Medical Council of India Code of Ethics

4. *Ethics of the Individual*

The patient as a person, The Right to be respected, Truth and Confidentiality
The autonomy of decision, The concept of disease, health and healing
The Right to health
Ethics of Behavior modification
The Physician – Patient relationship
Organ donation

5. *The Ethics of Human life*

What is human life
Criteria for distinguishing the human and the non – human
Reasons for respecting human life
The beginning of human life
Conception, contraception, Abortion
Prenatal sex- determination
In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)
Artificial Insemination by Donor (AID),
Surrogate motherhood, Semen Intra fallopian Transfer (SIFT)
Gamete Intra fallopian Transfer (GIFT), Zygote Intra fallopian Transfer (ZIFT)
Genetic Engineering

6. *The Family and Society in Medical Ethics*

The ethics of human sexuality
Family Planning perspectives
Prolongation of life
Advanced life directives – The Living Will
Euthanasia
Cancer and Terminal Care

7. *Profession Ethics*

Code of conduct
Contract and confidentiality
Charging of fees, Fee – splitting
Prescription of drugs
Over – investigating the patient
Low – Cost drugs, Vitamins and tonics
Allocation of resources in health cares
Malpractice and Negligence

8. *Research Ethics*

Animal and experimental research / humanness
Human experimentation
Human volunteer research – Informed Consent
Drug trials

9. Ethical workshop of cases
Gathering all scientific factors
Gathering all human factors
Gathering all value factors
Identifying areas of value – conflict, Setting of priorities
Working out criteria towards decisions
10. Law and medicine
 - Medical Council Act
 - Consumer Protection Act
 - Statutory Laws
 - a) Article 21 of the Constitution – Right to life
 - b) 304 IPC (Indian Penal Code)
 - c) Drug Act

Recommended Reading

1. Francis C M Medical Ethics. 11 Ed. 2004. Jaypee Brothers, New Delhi, Rs. 150/-
2. Ethical Guidelines for Biomedical Research on Human Subjects, Indian Council of medical Research (ICMR), New Delhi, 2000
3. ICMR Guidelines on Animal Use, 2001, ICMR, New Delhi



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD MICROBIOLOGY

(Revised with effect from 2019-2020 onwards)

AIMS

The aim of this course is to train the students of Medicine in the field of Medical Diagnostic Microbiology. Knowledge and practical skills shall be acquired by the candidates in the sub-specialities of Bacteriology including Mycobacteriology, Virology, Parasitology, Immunology, Serology & Mycology so as to be able to deal with diagnosis and prevention of infectious diseases in the community. They will be trained in basic research methodology including molecular biology so that they are able to conduct fundamental and applied research. They will also be trained in teaching methods so that they can take up teaching assignments.

GOAL:

The goal of the postgraduate medical education shall be to produce a competent specialist and Medical teacher:

- Who shall recognize the health needs of the community and carry out professional obligations ethically in keeping with the objectives of the national health policy;
- Who shall have mastered most of the competencies, pertaining to Medical diagnostic Microbiology that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
- Who shall be aware of the contemporary advances and developments in the field of medical and diagnostic Microbiology
- Who shall have acquired the spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology
- Who shall have acquired the basic skills of teaching of the medical and paramedical professionals.

EDUCATIONAL OBJECTIVES:

KNOWLEDGE:

At the end of the course the students shall be able to:

1. State and explain the clinical features, etiology, pathogenesis and methods of laboratory diagnosis of infectious diseases and apply that knowledge in the treatment, prevention and control of communicable diseases caused by micro-organisms.
2. State and explain the principles of immunity and immunological phenomenon which help to understand the pathogenesis, laboratory diagnosis of infectious and non-infectious diseases.
3. Establish and practice "laboratory medicine" for diagnosis of infectious diseases in hospitals and community in the field of bacteriology, parasitology, virology, mycology, serology and immunology in the light of clinical findings.
4. Organize the prevention and control of communicable diseases in the community.
5. Understand and practice the principle of prevention and control of health care associated infections and rational antibiotic policy.
6. State the recent advances in the field of Medical Microbiology and apply this knowledge in understanding aetiopathogenesis and diagnosis of diseases caused by micro-organisms.
7. Carry out fundamental or applied research in the branches of medicine involving microbiological work.
8. Develop specialization in any of the above subspecialities.
9. Undertake teaching assignments in the subject of medical Microbiology.

(B) Skills

At the end of the course the student shall be able to

1. Plan the laboratory investigations for the diagnosis of infectious diseases
2. Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.
3. Perform and interpret immunological and serological tests.

4. Operate routine and sophisticated instruments in the laboratory.
5. Develop microteaching skills and Pedagogy
6. Successfully implement the chosen research methodology

PROGRAM OUTCOMES

- PO 1 To produce a competent specialist and medical teacher who recognises the health needs of the community
- PO 2 To train postgraduates to carry out professional obligations ethically and in keeping with the objectives of the national health policy
- PO 3 To educate postgraduates so they are aware of contemporary advances in the field of medical and diagnostic microbiology
- PO 4 To enable postgraduates to master the competencies pertaining to diagnostic Microbiology as relevant to secondary and tertiary levels of the health care system
- PO 5 To foster the spirit of scientific enquiry and orient the trainee to the principles of research methodology and epidemiology
- PO 6 To help trainees acquire the basic skills of teaching medical and paramedical professionals
- PO 7 To sensitise postgraduates to the importance of quality control in laboratory medicine.
- PO 8 To enable postgraduates to understand and implement the guidelines for hospital infection control
- PO 9 To help the trainee understand the clinical, therapeutic and preventive aspects of infectious diseases of regional, national and global importance

PROGRAM SPECIFIC OUTCOMES

- PSO 1 To enable the trainee to understand and explain the principles of immunology, etiopathogenesis, laboratory diagnosis and antimicrobial therapy of bacterial, viral, parasitic and fungal diseases
- PSO 2 To involve the trainee in carrying out fundamental or applied research in one of these subspecialties in the form of a dissertation
- PSO 3 To educate postgraduates in the principles of prevention and control of healthcare associated infections and rational antibiotic policy
- PSO 4 To make the postgraduate capable of establishing and practising laboratory medicine for the diagnosis of infectious diseases in the light of clinical findings

COURSE CONTENT (SYLLABUS)

DURATION OF COURSE:

The minimum period of training shall be three calendar years and the candidates can be admitted to this training after their full registration with the Medical Council. No exemption shall be given from this period of training of three years either for doing housemanship or for any other experience or diploma.

TRAINING PROGRAM:

The candidates joining the course must work as full time residents during the whole period of their postgraduate training. They will be required to attend a minimum of 80% of training period. Candidate shall be given full time responsibility and assignments and their participation in all facets of the educational process assured. Postgraduate students must maintain a record book of the work carried out by them and the training undergone by them during the period of training. These record books shall be checked and assessed by the faculty.

TEACHING /LEARNING METHODS:

Learning in M. D. (Microbiology) will essentially be self-learning.

Following teaching-learning methods shall be followed-

Group teaching sessions:

- Journal review
- Subject seminar presentation
- Group discussion
- Slides seminars
- Clinical case presentations pertaining to infectious diseases
- Presentation of the findings of an exercise on any of the sub-specialities
- Participation in CME programs and conferences

Hands on experience (practical training)

Practical training shall be imparted by posting the students in various subspecialities (sections) as detailed in the intrinsic and extrinsic rotation. Student shall be actively involved in day to day working of all the sections. He/she will be trained under the guidance of teachers in all the aspects of Clinical Microbiology and applied aspects of laboratory medicine including collection and transport of specimens, receiving of samples, preparation of requisite reagents, chemicals, media and glassware, processing of specimens, performing required antimicrobial susceptibility testing and reporting on the specimens, interpretation of results, sterilization procedures, bio-safety precautions, infection control practices, maintenance of equipments, record keeping and quality control in Microbiology.

Suggested schedule of rotation:

Intrinsic rotation:

1. Bacteriology(Aerobic and anaerobic) 6 months
2. Mycobacteriology 3 months
3. Hospital infection surveillance 3 months
4. Serology/Immunology 6 months
5. Mycology 3 months
6. Virology/HIV 3 months
7. Parasitology 3 months
8. Clinical Microbiology(OPD) 2 months
9. Molecular Diagnostics 1 month

Extrinsic rotation:

Clinical Pathology 3 months

*Elective posting 3 months

Total 36 months

Emergency duty:

Student shall be posted for managing emergency laboratory services in Microbiology. He/she will deal with all the emergency investigations in Microbiology.

Dissertation

The purpose of dissertation is to impart training in research methodology

Training in research methodology shall be imparted by planning of a research project by the student under the guidance of a recognized guide to be executed and submitted in the form of a dissertation. The dissertation is aimed at training the candidate in research methods and techniques. It will include identification of a research question, formulation of a hypothesis, search and review of relevant literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis of the results and drawing conclusions.

The topic shall be communicated to the university within six months of registration and at least 12 months should be spent on the research project. The dissertation shall be completed and submitted by the student six months before appearing for the final university examination.

Teaching experience:

Student shall be actively involved in the teaching of undergraduate students.

He/she will be trained in teaching methods and use of audiovisual aids.

BROAD AREAS OF STUDY

General Microbiology; Systematic Bacteriology, Mycology, Virology, Parasitology; Serology , Immunology, Molecular diagnostics and Applied Clinical Microbiology including recent advances in Microbiology.

GENERAL MICROBIOLOGY

1. History and pioneers in Microbiology
2. Microscopy
3. Morphology of bacteria and other micro-organisms.
4. Nomenclature and classification of microbes.
5. Growth and nutrition of bacteria.
6. Bacterial metabolism.
7. Sterilization and disinfection.
8. Biomedical waste disposal
9. Bacterial toxins.
10. Bacterial antagonism: Bacteriocins.
11. Bacterial genetics, gene cloning.
12. Antibacterial substances used in treatment of infections and drug resistance in bacteria.
13. Bacterial ecology-normal flora of human body, hospital environment, air, water and milk
14. Host parasite relationship.
15. Quality control and Quality Assurance in Microbiology.
16. Laboratory Biosafety
17. Health care associated infections- prevention and control

IMMUNOLOGY AND APPLIED ASPECTS

1. The normal immune system.
2. Innate immunity.
3. Antigens.
4. Immunoglobulins.
5. Complement.
6. Antigen and antibody reactions.
7. Hypersensitivity.
8. Cell mediated immunity.
9. Immunodeficiency.
10. Autoimmunity.
11. Immune tolerance.
12. Transplantation immunity.
13. Tumour immunity.
14. Prophylaxis and immunotherapy
15. Measurement of immunity.
16. Immunity and immunopathogenesis of specific infectious diseases
17. Molecular Biology Techniques. For e.g. PCR, DNA probes.

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by them
2. Staphylococcus and Micrococcus; Anaerobic Gram positive cocci.
3. Streptococcus and Lactobacillus.
4. Neisseria, Branhamella and Moraxella.
5. Corynebacterium and other coryneform organisms.
6. Bacillus: the aerobic spore-bearing bacilli.

7. Clostridium: the spore-bearing anaerobic bacilli.
8. Non-sporing anaerobes
9. The Enterobacteriaceae.
10. Vibrios, Aeromonas, Plesiomonas, Campylobacter and Spirillum, H. pylori
11. Erysipelothrix and Listeria
12. Pseudomonas.
13. Chromobacterium, Flavobacterium, Acinetobacter and Alkaligenes.
14. Pasteurella, Francisella.
15. Haemophilus and Bordetella.
16. Brucella.
17. Mycobacteria.
18. The spirochaetes.
19. Actinomyces, Nocardia and Actinobacillus.
20. Mycoplasmatales: Mycoplasma, Ureaplasma and Acholeplasma.
21. Rickettsiae.
22. Chlamydiae.
23. Emerging bacterial pathogens.

VIROLOGY

1. The nature of viruses
2. Classification of viruses
3. Morphology :virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Vaccines and antiviral drugs
9. Bacteriophages
10. Pox viruses
11. Herpes viruses
12. Vesicular viruses
13. Togaviridae
14. Bunyaviridae
15. Arenaviridae
16. Marburg and Ebola viruses
17. Rubella virus
18. Orbi viruses
19. Influenza virus
20. Respiratory disease: Rhinoviruses, adenoviruses, corona viruses
21. Paramyxoviridae
22. Enteroviruses : Polio, Echo, Coxsackie viruses
23. Other enteric viruses
24. Hepatitis viruses
25. Rabies virus
26. Slow viruses
27. Human immunodeficiency viruses
28. Oncogenic viruses
29. Teratogenic viruses
30. Viruses of gastroenteritis
31. Prion diseases
32. Emerging viral infections – SARS, Avian influenza

PARASITOLOGY

1. Protozoan parasites of medical importance : Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Sarcocystis, Cryptosporidium, Balantidium, Isospora, Cyclospora, Microsporidium etc.
2. Helminthology : All those medically important helminths belonging to Cestoda, Trematoda and Nematoda.
Cestodes : Diphyllbothrium, Taenia, Echinococcus, Hymenolepis, Dypylidium, Multiceps etc.
Trematodes : Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc.
Nematodes : Trichuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.
3. Ectoparasites : Common arthropods and other vectors viz., Mosquito, Sandfly, Ticks, Mite, Cyclops.

MYCOLOGY

1. The morphology and reproduction of fungi and antimycotic agents
2. Classification of fungi
3. Contaminant and opportunistic fungi
4. Fungi causing superficial mycoses
5. Fungi causing subcutaneous mycoses
6. Fungi causing systemic infections
7. Antifungal agents

APPLIED CLINICAL MICROBIOLOGY

1. Epidemiology of infectious diseases
2. Hospital acquired infections
3. Infections of various organs and systems of the human body
4. Molecular genetics as applicable to Microbiology
5. Automation in Microbiology
6. Rapid diagnostic techniques for microbial diseases.
7. Vaccinology : principle, methods of preparation, administration of vaccines
8. Outbreak investigations & disaster management
9. Biological warfare

MOLECULAR BIOLOGY

1. Basic Genetics- RNA, DNA, replication, transcription, translation, gene expression, operon concept (lac and tryptophan operons), Coiling and super coiling, topoisomerases, satellite DNA, organization of prokaryotic and eukaryotic genome, chromosomes – structure and organization
2. Recombinant DNA technology- Cloning, Vectors, transgenic animals, Gene therapy
3. DNA techniques basics- PCR Southern, Western, Northern, In situ Hybridization RFLP, HGP, Karyotyping, Microarray with special reference to Microbiology
4. Cell Cycle And Cell Biology- Nuclear and cell division, mitosis, sexual reproduction, meiosis, genetic recombination. Signal transduction, cell communication, Intracellular compartment and protein sorting, Endocytosis, generation of antibody diversity
5. Mutations – Spontaneous, Induced, Point, Silent mutations, frameshift mutations. Physical and chemical mutagens, Site-directed mutagenesis, molecular basis of mutations
6. Bacterial Genetics
Introduction and bacterial transformation Specific bacteria and molecular biology
Mycobacterium tuberculosis, Salmonella, Vibrio, Haemophilus influenzae, drug resistance, Staphylococcus aureus, E. coli, Anaerobes etc.

7. Virology- Rabies, Rota V, HPV, HIV, HBV, HCV, EBV, HSV etc 8.Mycology, Parasitology- Yeast, fungus, malarial parasites, Toxoplasma etc

BIOSTATISTICS AND RESEARCH METHODOLOGY

1. Introduction to Biostatistics
2. Need for statistical methods in medicine
3. Public health and biology – their uses and misuses
4. Types of variables – data collection methods
5. Population and sampling
6. Protocol writing and study designs
7. Rationale
8. Review of Literature
9. Objectives
10. Prevalence and incidence studies
11. Case-control and cohort studies
12. Experimental studies – randomization
13. Descriptive data analysis methods
14. Statistical Tables
15. Diagrams and Graphs
16. Measures of average and dispersion
17. Correlation and regression analysis
18. Logic of Statistical Inference
19. Concept of Standard error
20. Types I and II error
21. Interval estimation of parameters
22. Principles of tests of significance
23. Estimation of minimum sample size in different designs of studies and sampling methods
24. Methods of tests of significance of statistical hypotheses:
25. Student's 'T' tests and analysis of variance
26. Non-parametric methods
27. Statistical methods in screening and diagnosis (validity parameters)
28. Statistical methods in planning and analysis of clinical trials
29. Multivariate analysis methods
30. Statistical methods in evidence based medicine

PRACTICALS (SKILLS)

BACTERIOLOGY

Must acquire:

1. Care and operation of Microscopes viz. Light, Dark ground, Phase contrast, Inverted, Fluorescent microscopes.
2. Preparation of stains viz. Gram's, Albert's, Ziehl- Neelsen and other special stains - performing of staining and interpretation of stained smears.
3. Washing and sterilization of glassware including plugging and packing.

4. Operation of incubator, autoclave, hot air oven, inspissator, distillation plant, filters like Seitz and membrane and sterility tests.
 5. Care and maintenance of common laboratory equipments like water bath, centrifuge, refrigerators, incubators etc.
 6. Preparation and pouring of liquid and solid media - Nutrient agar, Blood agar, MacConkey agar, sugars, TSI agar, Robertson's cooked meat, Lowenstein-Jensen's, selective media.
 7. Preparation of reagents – oxidase, Kovac, etc.
 8. Tests for beta-lactamases including ESBLs.
 9. Collection of specimens for Microbiological investigations such as blood, urine, throat swab, rectal swab, stool, pus, OT specimens.
 10. Preparation, examination and interpretation of direct smears from clinical specimens, viz. Sputum for AFB – ZN & auramine O, slit smears for *M. leprae*, -ZN stain, conjunctival smear for Chlamydiae – Giemsa/Iodine.
 11. Techniques of anaerobiosis – Gaspak system, anaerobic jars-evacuation & filling with H_2 , CO_2
 12. Identification of bacteria of medical importance upto species level (except anaerobes – upto generic level)
 13. Quantitative analysis of urine by pour plate method and semiquantitative analysis by standard loop test for significant bacteriuria.
 14. Plating of clinical specimens on media for isolation, purification identification and quantitation.
 15. Tests for motility: hanging drop, Craigie's tube, dark ground microscopy for Spirochaetes – Treponema & Leptospira.
 16. In-vitro toxigenicity tests – Elek test, Nagler's reaction
 17. Special tests – Bile solubility, chick cell agglutination, sheep cell haemolysis, niacin and catalase tests for mycobacterium, satellitism, CAMP test, catalase test and slide agglutination tests, and other as applicable identification of bacteria upto species level
 18. Preparation of antibiotic discs; performance of antimicrobial susceptibility testing by Kirby-Bauer disk diffusion method; estimation of Minimum inhibitory /Bactericidal concentrations by tube/plate dilution methods.
- Tests for drug susceptibility of Mycobacterium tuberculosis
19. Skin tests like Mantoux, Lepromin etc.
 20. Testing of disinfectants- Phenol coefficient and 'in use' tests.
 21. Quality control of media reagents etc. and validation of sterilization procedures.
 22. Aseptic practices in laboratory and safety precautions.
 23. Disposal of contaminated material like cultures.

24. Bacteriology of food, water, milk, air

25. Maintenance of stock cultures.

Desirable to acquire:

1. Care and breeding of laboratory animals viz. Mice, rats, guinea pigs and rabbits.
2. Techniques of withdrawal of blood from laboratory animals including sheep.
3. Inoculation of infective material in animals by different routes.
4. Animal pathogenicity /toxicity tests for *C.diphtheriae*, *Cl.tetani*, *S.pneumoniae*, *S.typhimurium*, *K. pneumoniae* etc.
5. Performance of autopsy on animals.
6. Isolation of plasmids and Conjugation experiments for transfer of drug resistance
7. Serum antibiotic assays eg. Gentamicin
8. Phage typing for staphylococci, *S.typhi* etc.
9. Bacteriocin typing eg. Pyocin, Colicin etc.
10. Enterotoxigenicity tests like rabbit ileal loop, intragastric inoculation of mouse, Sereny's test.
11. Mouse foot pad test for *M.leprae*

IMMUNOLOGY/ SEROLOGY

1. Collection of blood by venepuncture, separation of serum and preservation of serum for short and long periods.
2. Preparation of antigens from bacteria or tissues for Widal, Weil-Felix, VDRL, etc. and their standardisation.
3. Preparation of adjuvants like Freund's adjuvant.
4. Raising of antisera in laboratory animals.
5. Performance of serological tests viz. Widal, Brucella tube agglutination, indirect haemagglutination, VDRL, Paul-Bunnell, Rose-Waaler, IFA.
6. Immunodiffusion in gels, counter immunoelectrophoresis- visualization and interpretation of bands.
7. Performance and interpretation of Enzyme linked immunosorbent assay.
8. Latex and staphylococcal co-agglutination tests.

Desirable to acquire:

1. Leucocyte migration inhibition test.
2. T-cell rosetting.
3. Flow Cytometry

4. Radial immunodiffusion.
5. Immunoelectrophoresis.
6. Neutrophil phagocytosis.

MYCOLOGY

Must acquire:

1. Collection of specimens for mycology.
2. Direct examination of specimens by KOH, Gram, Kinyoun's, Giemsa, Lactophenol cotton blue stains.
3. Examination of histopathology slides for fungal infections.
4. Isolation and identification of pathogenic yeasts and moulds and recognition of common laboratory contaminants.
5. Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slide culture.
6. Maintenance of stock cultures.
7. Animal pathogenicity tests viz. Intracerebral and intraperitoneal inoculation of mice for cryptococcus.

PARASITOLOGY

Must acquire:

1. Examination of faeces for parasitic ova and cysts etc. by direct and concentration methods (salt floatation and formol - ether methods) and complete examination for other cellular features.
2. Egg counting techniques for helminths.
3. Examination of blood for protozoa and helminths by wet mount, thin and thick stained smears.
4. Examination of other specimens for e.g. urine, C.S.F, bone marrow etc. for parasites.
5. Histopathology sections – examination and identification of parasites.
6. Performance of stains – Leishman, Giemsa, Modified Acid Fast, Toluidine Blue O.
7. Identification of common arthropods and other vectors viz. Mosquito, sand fly, ticks, mite and cyclops.
8. Collection of specimens.
9. Preservation of parasites – mounting, fixing, staining etc.

Desirable to acquire:

1. In-vitro culture of parasites like entamoeba, leishmania, P.falciparum.
2. Maintenance of toxoplasma gondii in mice.
3. Preparation of media – NIH, NNN etc.
4. Copro-culture for larva of hook worms.
5. Antigen preparation viz. Entamoeba, Filarial, Hydatid for serological tests like IHA and skin test like Casoni's.
6. Permanent staining techniques like iron haematoxylin

VIROLOGY

Must acquire:

1. Preparation of glassware for tissue culture (washing, sterilization)
2. Preparation of media like Hanks, MEM.
3. Preparation of clinical specimens for isolation of viruses.
4. Serological tests-ELISA and rapid tests for HIV, RPHA for HbsAg, Haemagglutination inhibition for influenza, AGD and counterimmunoelectrophoresis for detection of viral antigens or antiviral antibodies.
5. Chick embryo techniques- inoculation and harvesting.
6. Handling of mice, rats, guinea pigs, rabbits for collection of blood, pathogenicity test etc.

Desirable to acquire:

1. Preparation of Monkey Kidney Cells (Primary) maintenance of continuous cell lines by subcultures.
- Preservation of cell cultures.
2. Recognition of CPE in tissue cultures.
3. Performance of haemadsorption, haemagglutination, immunofluorescence, neutralization tests for identification of viruses.

COURSES

Course I General Microbiology and Immunology (U19MDMI01)

CO1: To understand the history and pioneers in microbiology

CO2: To identify the morphology of bacteria and other micro-organisms

CO3: To understand the various methods of sterilisation and disinfection and its application in laboratory medicine

CO4: To help the trainee acquire knowledge about biological waste disposal

CO5: To understand the various hospital acquired infections and their preventive and control measures

CO6: To involve the trainee in quality control and quality assurance in microbiology

CO7: To understand and interpret the various antigen antibody reactions, hypersensitivity reactions and their clinical applications

CO8: To educate the postgraduates on the types of immunity, immunopathogenesis of diseases and measurement of immunity

GENERAL MICROBIOLOGY

1. History and pioneers in Microbiology

2. Microscopy

3. **Morphology of bacteria and other micro-organisms.**

4. Nomenclature and classification of microbes.

5. Growth and nutrition of bacteria.

6. Bacterial metabolism.

7. Sterilization and disinfection.

8. Biomedical waste disposal

9. Bacterial toxins.

10. Bacterial antagonism: Bacteriocins.

11. Bacterial genetics, gene cloning.

12. Antibacterial substances used in treatment of infections and drug resistance in bacteria.

13. Bacterial ecology-normal flora of human body, hospital environment, air, water and milk

14. **Host parasite relationship.**

15. Quality control and Quality Assurance in Microbiology.

16. Laboratory Biosafety

17. Health care associated infections- prevention and control

IMMUNOLOGY AND APPLIED ASPECTS

1. The normal immune system.

2. **Innate immunity.**

3. Antigens.

4. **Immunoglobulins.**

5. Complement.

6. Antigen and antibody reactions.

7. **Hypersensitivity.**

8. Cell mediated immunity.

9. Immunodeficiency.

10. Autoimmunity.

11. Immune tolerance.

12. Transplantation immunity.

13. Tumour immunity.

14. Prophylaxis and immunotherapy

15. Measurement of immunity.

16. Immunity and immunopathogenesis of specific infectious diseases

17. Molecular Biology Techniques. For e.g. PCR, DNA probes.

Course II Systematic Bacteriology (U19MDMI02)

CO1: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Staphylococcus aureus*

CO2: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Corynebacterium diphtheriae*

CO3: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Clostridium perfringens*

CO4: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of Enterobacteriaceae

CO5: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Pseudomonas aeruginosa*

CO6: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of spirochaetes

CO7: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Brucella*

CO8: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Mycobacteria*

CO9: To understand the isolation, description, identification , epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of *Vibrio cholerae*

SYSTEMATIC BACTERIOLOGY

1. Isolation, description and identification of bacteria. The epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of disease caused by them

1. 2. *Staphylococcus* and *Micrococcus*; Anaerobic Gram positive cocci.
2. *Streptococcus* and *Lactobacillus*.
3. *Neisseria*, *Branhamella* and *Moraxella*.
4. *Corynebacterium* and other coryneform organisms.
5. *Bacillus*: the aerobic spore-bearing bacilli.
6. *Clostridium*: the spore-bearing anaerobic bacilli.
7. Non-sporing anaerobes
8. The Enterobacteriaceae.
9. *Vibrios*, *Aeromonas*, *Plesiomonas*, *Campylobacter* and *Spirillum*, *H.pylori*
10. *Erysipelothrix* and *Listeria*
11. *Pseudomonas*.
12. *Chromobacterium*, *Flavobacterium*, *Acinetobacter* and *Alkaligens*.
13. *Pasteurella*, *Francisella*.
14. *Haemophilus* and *Bordetella*.
15. *Brucella*.
16. *Mycobacterium tuberculosis*
17. *Microbacterium avium* complex
18. The spirochaetes.
19. *Leptospira interrogans*
20. *Actinomyces*, *Nocardia* and *Actinobacillus*.
21. *Mycoplasmatales*: *Mycoplasma*, *Ureaplasma* and *Acholeplasma*.
22. *Rickettsiae*.
23. *Chlamydiae*.
24. Emerging bacterial pathogens.

Course III Mycology & Virology (U19MDMI03)

CO1: To help them to understand the morphology, pathogenesis, laboratory diagnosis, prophylaxis of HIV, Hepatitis B

CO2: To develop skills to identify outbreaks due to viral diseases and to implement appropriate control measures

CO3: To educate the postgraduates on the morphology, pathogenesis, laboratory diagnosis, preventive and control measures of clinically significant yeasts and molds

CO4: To identify the methods of antifungal susceptibility testing

VIROLOGY

1. The nature of viruses

2. Classification of viruses

3. Morphology :virus structure

4. Virus replication

5. The genetics of viruses

6. The pathogenicity of viruses

7. Epidemiology of viral infections

8. Vaccines and antiviral drugs

9. Bacteriophages

10. Pox viruses

11. Herpes viruses

12. Vesicular viruses

13. Togaviridae

14. Bunyaviridae

15. Arenaviridae

16. Marburg and Ebola viruses

17. Rubella virus

18. Orbi viruses

19. Influenza virus

20. Respiratory disease: Rhinoviruses, adenoviruses, corona viruses

21. Paramyxoviridae

22. Enteroviruses : Polio, Echo, Cocksackie viruses

23. Other enteric viruses

24. Hepatitis viruses

25. Rabies virus

26. Slow viruses

27. **Human immunodeficiency viruses**

28. Oncogenic viruses

29. Teratogenic viruses

30. Viruses of gastroenteritis

31. Prion diseases

32. Emerging viral infections – SARS, Avian influenza

MYCOLOGY

1The morphology and reproduction of fungi and antimycotic agents

2 Classification of fungi

3. Contaminant and opportunistic fungi

4. Fungi causing superficial mycoses

5. Fungi causing subcutaneous mycoses

6. Fungi causing systemic infections

7. Antifungal agents

Course IV Parasitology, Applied Microbiology and Recent Advances (U19MDMI04)

CO1: To understand the isolation, description, identification, epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of intestinal protozoans and nematodes

CO2: To understand the isolation, description, identification, epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of hemoflagellates

CO3: To understand the isolation, description, identification, epidemiology, pathogenesis, antigenic characteristics and laboratory diagnosis of malaria and filaria

CO4: To utilise automation in microbiology and molecular genetics for identification of infectious agents

CO5: To understand the concepts of vaccinology

PARASITOLOGY

1. **Protozoan parasites of medical importance** : Entamoeba, Giardia, Trichomonas, Leishmania, Trypanosoma, Plasmodium, Toxoplasma, Nigleria fowleri

Sarcocystis, Cryptosporidium, Balantidium, Isospora, Cyclospora, Microsporidium etc.

2. **Helminthology** : All those medically important helminths belonging to Cestoda, Trematoda and Nematoda.

Cestodes : Diphyllbothrium, Taenia, Echinococcus, Hymenolepis, Dypylidium, Multiceps etc.

Trematodes : Schistosomes, Fasciola, Gastrodiscoides, Paragonimus, Clonorchis, Opisthorchis etc.

Nematodes : Trichuris, Trichinella, Strongyloides, Ancylostoma, Necator, Ascaris, Toxocara, Enterobius, Filarial worms, Dracunculus, etc.

3. **Ectoparasites** : Common arthropods and other vectors viz., Mosquito, Sandfly, Ticks, Mite, Cyclops.

APPLIED CLINICAL MICROBIOLOGY

1. **Epidemiology of infectious diseases**

2. **Methods of sterilisation**

3. Hospital acquired infections

4. Infections of various organs and systems of the human body

5. Molecular genetics as applicable to Microbiology

6. Control of Hospital acquired infections

7. Automation in Microbiology

8. **Rapid diagnostic techniques for microbial diseases.**

9. Vaccinology : principle, methods of preparation, administration of vaccines

10. Outbreak investigations & disaster management

11. **Biological warfare**

Course V Soft Skills (U19MDMI05) – Elective Course

CO1: The postgraduate will develop skills in research, be able to investigate emerging infections and implement appropriate research methodology

CO2: The postgraduate shall develop skills in teaching medical microbiology to medical and laboratory students

CO3: The postgraduate student will develop skills in team work and administration of a department.

SUGGESTED READING:

BOOKS:

Reference books (Please refer the most recent edition)

1. Topley and Wilson's Microbiology and Microbial infections. 8 volumes 2005, 10th edition

2. Color Atlas and Textbook of Diagnostic Microbiology: Elmer W Koneman -2006, 6th edition

3. Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases -2005, 6th edition
4. Microbiology in Clinical Practice: Shanson-1999, 3rd edition
5. Immunology: Janis Kuby- 2003.
6. Basic Clinical Immunology., Fudenburg, Stites, Caldwell, Weils.
7. Control of Hospital Infection- A practical handbook (most recent edition)
8. Bailey and Scott's Diagnostic Microbiology by Forbes/ Sahm/Weissfeld
9. Text book of Parasitology., Chatterjee K.D.
10. Textbook of Microbiology – by R.Ananthanarayanan / C.K. Jayaram Panicker
11. Textbook of Medical Parasitology – by C.K. Jayaram Panicker
12. Medical Microbiology by Greenwood / Slack / Peutherer
13. Textbook of Medical Mycology- Jagdish Chander
14. Medical Microbiology & Immunology by Warren Levinson / Ernest Jawetz
15. Medical Parasitology by RL Ichhpujani / Rajesh Bhatia
16. Textbook of Virology by Rhodes/ Van Rooyen
18. Clinical Mycology by Smith / Conant
19. Mackie & McCartney – Practical Medical Microbiology by Collee/Fraser/Marmion/Simmons

20. Manual of Clinical Microbiology- Patrick R Murray /Ellen Jo Baron/ James H Jorgensen
21. Fundamentals of Diagnostic Mycology- Fran Fisher & Norma B Cook

22. Genes VII –Benjamin Lewin
23. Atlas of Clinical fungi-2nd edition G.S.de Hoog, J.Guarro, J.Gene & M.J.Figueras

Further Reading

1. Mycology - Rippons
2. Essentials of Immunology- Roitt
3. Virology - Clinical Virology by Rich
4. Gradwohl's Clinical Laboratory Methods and Diagnosis.

Journals

1. Indian Journal of Medical Microbiology
2. Clinical Microbiology Reviews
3. Journal of Clinical Microbiology
4. Journal of Medical Microbiology
5. Journal of AIDS
6. Journal of Hospital Infection
7. Indian Journal of Tuberculosis and Lung Diseases.
8. Indian Journal of Medical Research
9. JAAC
10. Parasitology Today
11. Journal of Infection
12. Infection Control and Hospital Epidemiology
13. Indian Journal of Tuberculosis
14. Journal of Associations of Physicians of India
15. Lancet-Infectious Diseases
16. Emerging Infectious Diseases-online

17. New England Journal of Medicine- online
18. British Medical Journal
19. Scandinavian Journal of Infectious Diseases
20. ICMR Bulletin
21. AIDS Research & Review
22. MMWR
23. Tubercle
24. WHO Bulletin
25. Journal of American Medical Association
26. Paediatric infectious diseases
27. Indian Journal of Leprosy
28. International Journal of Leprosy
29. Immunology
30. American journal of Epidemiology

Important Websites:

1. Center for Disease Control -www.cdc.gov
2. World Health Organization- www.who.int
3. Infectious Disease Society of America- www.idsociety.org
4. United Nations Program on HIV/ AIDS- www.unaids.org
5. Johns Hopkins Infectious Diseases- www.hopkins-id.edu
6. National Library of medicine- www.pubmed.com
7. MD Consult- www.mdconsult.com
8. Global Infectious Disease epidemiology network www.gideononline.com
9. National AIDS Control Organization- www.nacoinia.org
10. Tuberculosis Research Centre- www.trc-chennai.org

EVALUATION :

Evaluation shall be done on the basis of Theory, Practical and Oral (Viva-voce) examination and internal assessment.

All the evaluation heads namely Theory, Practical (including oral) and internal assessment shall be marked as marks.

PASSING:

Separate minimum of 50% in theory in all papers taken together ; 50% in practical and 50% in oral examination, 50% in internal assessment shall be necessary for passing. A successful candidate passing the university examination in first attempt will be declared to have passed the examination with distinction, if the grand total aggregate mark is 70% and above . The mark distribution is as detailed below.:-

EVALUATION HEAD	MAXIMUM MARKS	MINIMUM FOR PASSING
THEORY	400	200
PRACTICAL	200	100
ORAL	100	50
INTERNAL ASSESSMENT	100	50

THEORY:

Theory will consist of FOUR papers with following distribution-

PAPER I General Microbiology & Immunology

PAPER II Systematic Bacteriology

PAPER III Mycology & Virology

Paper IV Parasitology, Applied Microbiology & Recent Advances

DURATION: Each paper will be of three hours duration.

FORMAT:

All papers will have the following format:

SECTION A – Structured essay question (30)

SECTION B – Short essay questions (15x 2=30)

SECTION C – Short answer questions (8x5=40)

MARKING PATTERN FOR THEORY EXAMINATION

PAPER	MAXIMUM MARKS			TOTAL	MINIMUM FOR PASSING IN EACH PAPER	MINIMUM FOR PASSING
	SECTION A	SECTION B Short essay	SECTION C Short answer			
PAPER-I	30	15x2=30	8 x 5 =40	100	50	
PAPER-II	30	15x2=30	8 x 5 =40	100	50	
PAPER-III	30	15x2=30	8 x 5 =40	100	50	
PAPER-IV	30	15x2=30	8 x 5 =40	100	50	
TOTAL MARKS				400	--	200

PRACTICAL:

DURATION: Practical examination shall be conducted on THREE consecutive days. The time shall be adjusted by the examiners to cover all exercises.

EXERCISES: The practical examination will consist of following exercises conjointly conducted and evaluated by the four examiners (Two internals and two externals).

EXERCISES:**A. Long Exercise:**

Exercise in Clinical Bacteriology: Problem Solving Exercise: where a brief history along with relevant clinical findings should be given. Student should be asked to list relevant investigations required & clinical specimen to be given. Isolation and identification of bacteria from the given clinical specimen and antimicrobial sensitivity of the isolated organism to be performed.

B. Short Exercises:

1. Exercise in Bacteriological/Mycobacteriological Techniques: Identification of bacteria (aerobe/anaerobe/Mycobacteria) in given pure culture.

2. Ziehl-Neelsen Staining :

Preparation of smear; staining of prepared / given smear and reporting on findings. This exercise shall include acid - fast staining for tubercle bacilli or lepra bacilli or modified acid fast staining (for e.g. parasites/spores).

3. Exercise in Virology:

The following exercises to be performed –

A) Embryonated egg inoculation / harvesting

A) ELISA for HIV/ ELISA ,for detection of HBsAg, any rapid test for HIV antibodies or any other serological test for detection of viral antigen / antibody (eg. CIEP).

4. Identification of fungi in minimum two given cultures – one yeast and one mould.

5. Exercise in Parasitology. Any one of the following exercises to be performed –

- Examination of stool for ova/cyst by direct/ concentration method.

- Preparation of peripheral smear and staining by Leishman stain.

Reporting of parasites in the prepared/given smear.

6. Exercise in Immunology/Serology:

- Any one of the Serology/Immunology techniques commonly used in diagnostic clinical microbiology to be performed. Serological test – (For e.g. Latex agglutination(ASO, CRP, RA etc.), tube agglutination (Widal, Brucella, Paul-Bunnell etc.), slide flocculation (VDRL), Passive haemagglutination(e.g. TPHA), RPHA (e.g. for HBsAg), Dot blot assay (e.g. HIV Rapid test).

NOTE: The test to be performed in this exercise should be different in serological / immunological principle from that performed in Exercise 3.

7. Animal experiment : Details regarding care, handling and experimentation on animals shall be evaluated through simulations. Any common experimental procedure given to the student shall be subject to strict adherence to rules regarding handling, care and experimentation of animals.

8. Identification of microbiological findings in the given set of slides – parasitology, immunology, mycology, bacteriology or histopathology slides (10 slides).

Parallel testing of given exercise shall be done at the examination centre for checking the quality of chemicals, media, reagents and the test material.

ORAL (VIVA -VOCE)

Student will be examined by all the examiners together regarding his knowledge of basic aspects and recent advances in the field of microbiology and its subspecialties. Student will be assessed about his comprehension, analytical approach, expression, interpretation of data and his approach in solving the problem. Oral examination will also include presentation and discussion on dissertation.

DAY- WISE DISTRIBUTION OF EXERCISES:

DAY	DAY 2	DAY 3
Long exercise	Long exercise (contd)	Long exercise (contd)
Bacteriological techniques	Bacteriological techniques(contd)	Identification of slides
Ziehl Neelsen staining	Bacteriological techniques (contd)	Oral (Viva- voce)
Exercise in virology	Exercise in parasitology	
	Serology / Immunology techniques	

Day-wise distribution of exercises may be changed as per the convenience of the examiners.

EXERCISE / VIVA	MAXIMUM MARKS	MINIMUM PASSING IN EACH EXERCISE	TOTAL MINIMUM OF PASSING
A) LONG EXERCISE	30	----	15
B) SHORT EXERCISE			
Bacteriological techniques	20	4	--
Ziehl Neelsen staining	10	4	--
Exercise in Virology	20	4	--
ELISA for HIV	20	4	--
Exercise in Mycology	20	4	--
Exercise in Parasitology	20	4	--
Serology/ Immunology	20	4	--
Identification of slides	20	4	--
Animal experiment	20	4	--
Total of short exercises	170	--	85
C) ORAL (VIVA VOCE)	100	--	50
TOTAL A, B, C	300	--	150

INTERNAL ASSESSMENT:

Internal assessment shall be done by evaluation of the student in Theory and practical examinations conducted in 2nd, 4th and 5th term.

Student shall maintain a ' Record book' detailing the work done during his/her posting in various sub-specialties, participation in teaching-learning activities, progress of dissertation and involvement in undergraduate teaching program.

The internal assessment shall consist of:

- Annual evaluation at the end of second term - 25
- Annual evaluation at the end of fourth term – 25
- Evaluation at the end of fifth term - 25
- Student's application in each section - 15

e) Student's application in teaching –learning activities – 10
The total obtained out of hundred marks is to be added to final examination.
Internal assessment marks will be communicated to the university one month prior to the examination.

**MD MICROBIOLOGY
SAMPLE QUESTION
PAPER
GENERAL MICROBIOLOGY &
IMMUNOLOGY PAPER I**

Time: 3hrs

Max marks: 100

I Essay

Define Sterilisation. Classify the various agents used in sterilization. Discuss moist heat sterilization. Write a brief note on newer methods of sterilization.

30 marks

II Short essay

- A. Type III Hypersensitivity
- B. Healthcare associated infections

15x 2=30 marks

III Short notes

- A. Immune mechanism of graft rejection
- B. DNA sequencing
- C. Applications of Immunotherapy
- D. Scanning electron microscope
- E. Fimbriae

8x5=40 marks

**MD MICROBIOLOGY
SAMPLE QUESTION
PAPER SYSTEMATIC
BACTERIOLOGY**

PAPER II

Time: 3hrs

Max marks: 100

I Essay

Name the etiological agents, discuss the pathogenesis, laboratory diagnosis including recent advances and prophylaxis of Enteric fever

30 marks

II Short essay

A. Invasive pneumococcal disease: Clinical features, lab diagnosis, treatment and prophylaxis.

C. The recent advances in laboratory diagnosis of Tuberculosis

15x 2=30 marks

III Short notes

- A. Legionella pneumophila
- B. Pseudomembranous colitis
- C. Granuloma inguinale
- D. Stenotrophomonas maltophilia
- E. Scrub typhus

8x5=40 marks



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD PAEDIATRICS

(Revised with effect from 2019-2020 onwards)

Goals, Objectives,& Skills as per MCI Regulations

Goal .

The goal of post graduate medical education shall be to produce competent specialists and / or Medical teachers :-

- i. who shall recognize the health needs of the community, and perform the professional obligations ethically and in keeping with the objectives of the national health policy
- ii. who shall have mastered most of the competencies ,pertaining to pediatrics, that are required to be practiced at the secondary and tertiary levels of health care providing system.
- iii. who shall be aware of the contemporary advance and developments in pediatrics concerned.
- iv. who shall have acquired spirit of scientific enquiry and is oriented to the principles of research methodology ,and
- v. shall have acquired the basic skills in teaching of medical and para medical students.

Objectives :

At the end of post graduate training in pediatrics the student shall be able to ;

- i. Recognize the importance of the concerned speciality in the context of the health needs of the community and the national priorities in the health section,
- ii. practice the speciality ethically and in step with the principles of primary health care.
- iii. Demonstrate sufficient understanding of the basic sciences relevant to pediatrics
- iv. Identify social ,economic,environmental,biological and emotional determinants of health in a given case and take them in to account

while planning therapeutic ,rehabilitative, and preventive measures/ strategies.

- v. Diagnose and manage majority of conditions in pediatrics on the basis of clinical assessment, appropriately selected and conducted investigations.
- vi. Plan and advise measures for the prevention and rehabilitation of children suffering from diseases and disability related .
- vii. Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant.
- viii. Show empathy and human approach towards children and their families and exhibit interpersonal behaviour in accordance with norms and expectations.
- ix. Play the assigned role in the implementation of national health programme effectively and responsibly.
- x. Organise and supervise effectively the chosen .and /or assigned health care services
- xi. Develop skills as a self-directed learner, recognize continuing education needs ,select and use appropriate learning resources.
- xii. Demonstrate competence in basic concepts of research methodology,and be able to critically analyse relevant published research literature
- xiii. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing,general physicians and paramedical health workers
- xiv. Function as an effective leader of a health team engaged in health care ,research or training

Skills

Elicit an appropriate clinical history

Demonstrate appropriate clinical physical examination skills on children.

Plan ,decide up on and interpret appropriate cost effective investigations.

Perform essential procedures both diagnostic and therapeutic.

Manage, resuscitate and stabilize children in pediatric or Neonatal emergencies.

Communication and attitudes

Communicate appropriately with guardians and children, assisting in their health care decision making

Practice child health care at the highest ethical level, protecting the child at all costs.

Respect parent's (and their guardian's) rights and professional relationships (Doctor-Doctor, Doctor-Nurse, Doctor –Patient, Doctor-Society)

Program Outcomes

PO1 Competence to work as a specialist/ Medical teacher who shall recognize the health needs of the community, and perform the professional obligations ethically and in keeping with the objectives of the national health policy

PO2 Competence to work as a specialist/ Medical teacher at the secondary and tertiary levels of health care providing system.

PO3 Competence to work as a specialist/ Medical teacher who shall be aware of the contemporary advance and developments in pediatrics concerned.

PO4 Competence to work as a specialist/ Medical teacher who shall have acquired spirit of scientific enquiry and is oriented to the principles of research methodology.

PO5 Competence to work as a specialist/ Medical teacher who shall have acquired the basic skills in teaching of medical and para medical students.

Program Specific Outcomes

PSO1 Ability to recognize the importance of the concerned speciality in the context of the health needs of the community and the national priorities in the health sector

PSO2 Ability to practice the speciality ethically and in step with the principles of primary health care.

PSO3 Ability to demonstrate sufficient understanding of the basic sciences relevant to pediatrics

PSO4 Competence to elicit an appropriate clinical history

PSO5 Ability to identify social ,economic,environmental,biological and emotional determinants of health in a given case and take them in to account

PSO6 Skill to diagnose and manage the conditions in pediatrics on the basis of clinical assessment, physical examination and appropriately selected and conducted investigations.

PSO7 Skill in performing essential procedures, both diagnostic and therapeutic.

PSO8 Competence to plan and advise measures for the prevention and rehabilitation of children suffering from diseases and disability related .

PSO9 Skill in managing, resuscitating and stabilizing children in pediatric or Neonatal emergencies.

PSO10 Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant.

PSO11 Play the assigned role in the implementation of national health programme effectively and responsibly.

COURSES

Course - I Basic Sciences as Applied to Pediatrics and Growth & Development (U19MDPE01)

CO1: Application of knowledge of anatomy, genetics and embryology in the practice of pediatrics

CO2: Application of knowledge of physiology and biochemistry in the practice of pediatrics

CO3: Application of knowledge of pathology, microbiology and immunology in the practice of pediatrics

CO4: Application of knowledge of pharmacology in the practice of pediatrics

Knowledge of applied anatomy, genetics and embryology, physiology and biochemistry in the practice of pediatrics; knowledge of pathology, microbiology and immunology necessary in the community practice of pediatrics. Brief Knowledge of pharmacology necessary in the practice of pediatric.

Course - II General Pediatrics including Neonatology, Preventive and Social Pediatrics (U19MDPE02)

CO1: Skill in history taking, physical examination and investigations.

CO2: Competency to manage common diseases/conditions in neonates.

CO3: Competency in preventive and social aspects of pediatrics including immunization.

Practical Skill in history taking, performing physical examination and ordering appropriate investigations. Knowledge in knowing how to manage common diseases/conditions in neonates.

Competency in performing Neonatal Resuscitation

Competency in managing a floppy child

Failure to thrive

Competency in preventive aspects as well as social aspects of pediatrics including immunization.

Course - III Pediatric Specialities (U19MDPE03)

CO1: Knowledge about Infectious disease, Rheumatology, Psychiatry and Behavioral Sciences aspects of pediatrics.

CO2: Knowledge about Skin, Eye, ENT, Adolescent Health, Critical Care aspects of pediatrics.

CO3: Knowledge about accidents, poisoning, neurology, disabilities, nephrology, endocrinology and gastroenterology aspects of pediatrics.

CO4: Knowledge about Neurology and Disabilities, Nephrology, Hematology and Oncology aspects of pediatrics.

CO5: Knowledge about Endocrinology, Gastroenterology, Respiratory and Cardiovascular diseases as applicable to pediatrics.

Knowledge on Infectious disease, Rheumatology, Psychiatry, Behavioral Sciences Skin, Eye, ENT, Adolescent Health, Critical care aspects of pediatrics and its application in clinical scenario

Early detection and management of childhood malignancies

Long term prognosis in childhood malignancies

Cystic Fibrosis

Competency in managing accidents, poisoning, neurological disabilities, nephrology, Hematology and Oncology , endocrinology , Respiratory and Cardiovascular diseases and gastroenterological aspects of pediatrics.

Course - IV Recent Advances in Pediatrics (U19MDPE04)

CO1: Uptodate knowledge about recent trends in the speciality.

CO2: Uptodate knowledge in the diagnostic and therapeutic methods in the speciality.

CO3: Uptodate knowledge about the recent publications.

Recent advances with regards to diagnostic and therapeutic modalities in pediatrics in the international setting . Knowledge of recent trends and publications about pediatrics

Soft Skills (U19MDPE05) – Elective Course

CO1: Function as an effective leader of a team engaged in health care, research or training

CO2: Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing/general physicians and paramedical health workers

CO3: Demonstrate competence in basic concepts of research methodology, and be able to critically analyse relevant published research literature

CO4: Develop skills as a self-directed learner with the attitude to be a life long learner.

CO5: Skill to organise and supervise effectively the chosen and /or assigned health care services

CO6: Skill to communicate appropriately with guardians and children, assisting in their health care decision making

CO7: Skill to practice healthcare ethically, protecting the child at all costs.

CO8: Skill to organise and supervise effectively the chosen and /or assigned health care services

Training Period and method of training: Period of training is three years (36 months / 6 academic terms), for MD including the period of examination. In addition to the general pediatrics including neonatology, students have to undergo posting in pediatric neurology, pediatric cardiology, pediatric surgery, dermatology, child psychiatry and pediatric hemato oncology departments for specified periods to get required knowledge.

They have to maintain a Log Book from the very beginning to record the day to day activities. It has to be got signed from the concerned faculty.

Each MD candidate has to do a research work under a Guide who shall be a qualified P.G teacher as per the MCI regulations. The thesis should be submitted to the University at least 6 months prior to the beginning of theory examinations

Training programme shall consists of clinical discussions, bed side clinics, symposia Journal clubs, mortality conferences, and thesis presentation.

Formal teaching sessions:

In addition to bedside teaching rounds, at least 2hrs of formal teaching per day are must.

Case presentation 4 days a week

Journal club: once a month

Seminars: once a month

Grand Rounds: Twice a month

Subject Review: Twice a month

Death review meeting : once a month

Clinical pathological conference :once a month

Guest lectures: once a week

Telemedicine programme: Twice a month

Others : CME/PALS/NALS

They have to participate in undergraduate teaching of medical /paramedical students.They have to attend medical camps, work shops CME programmes and National conferences to update the knowledge.

Eligibility to appear the University Examination:**Eighty percent attendance compulsory for appearing the University examination.**

There will be 4 theory papers of 3 hour duration, covering Developmental pediatrics: growth and development including psychological development, psychological and behavioral disorders, laws relating to children, perinatal pediatrics, preventive pediatrics including child health services and under five clinics, nutrition and nutritional disorders, patho physiology of body fluids and drug therapy. Intensive care in pediatrics, and management of emergencies.

Immunity ,allergy and infectious diseases, parasitic infections, genetic disorders and chromosomal disorders and prenatal factors in disease, inborn error of metabolism. Disorders of digestive system, respiratory system, cardiovascular system. Disorders of blood, urinary system, endocrine system, genital organs, nervous system, muscle, bone and joints, skin and eyes and malignant disorders.

Allied subjects”

Anatomy: Applied embryology,Development of major organ systems

Physiology: Applied physiology with regard to major organ systems

Biochemistry: Biochemical basis of diseases in children-Nutritional and metabolic

Pathology: Patho physiology of diseases in children

Microbiology: Clinical microbiology, applied to investigations for diseases in children, serology, staining, cultures

Pharmacology Clinical pharmacology,therapeutics of childhood diseases, Rational drug therapy

Community medicine: Health care delivery systems-structure and function, health statistics,, National programmes.
 Pediatric surgery: Recognition and referral of surgical conditions in pediatrics
 Radiology : Clinical indications and interpretations of X ray, Ultrasound, CT, MRI.
 Legal and Ethical Medicine: Rights and protection of children, Consumer protection Act, Basic principals of Ethics.

There will be two University examinations in an year with an interval of not less than 4 months and not more than 6 months between the two examinations.

Four theory papers of 100 marks each:

Paper I: Basic sciences as applied to pediatrics and Growth & Development
 Paper II: General Pediatrics including neonatology, preventive and social pediatrics.
 Paper III: Pediatric specialities
 Paper IV: Recent advances in pediatrics

-5-

Clinical and Viva voce:

The total marks for practical/clinical examination shall be 200.

Clinical examination consists of one long case (45 minutes) for 100 marks and 2 shot cases (30 minutes each) of 100 marks together. Total of 200 marks.

Viva voce shall aim at assessing the candidates knowledge and competence about the subject, investigative procedures, therapeutic techniques, and other aspects of the speciality. Total marks for viva voce 100

Total marks for theory 400, Total marks for clinical & viva voce 300

Candidates shall secure not less than 50% marks in each head of passing which shall include (I) Theory (2) Practical including clinical and viva voce examination.

Maximum marks for	Theory (Max.)	Practical (Max.)	Viva (Max.)	Grand Total
MD degree course	400	200	100	700

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Recommended Reading

1. Nelson- Text book of Pediatrics
2. Forfar & Arneils- Text book of pediatrics
3. Illinworth- Normal child
4. David G Nathan- Hematology of Infancy & Childhood
5. Pediatric neurology- Swaiman.
6. Nadas- Pediatric cardiology
7. Meharban Singh's Care of the New borns

JOURNALS:

- 1.PCNA
- 2.Arhive of Diseases of Childhood
- 3.Indian Pediatrics
- 4.Indian J of Pediatrics
- 5.Pediatrics
- 6.Journal of Pediatrics
- 7.Acta Paediatrica Scandinavia

References Series

1. Year book of Pediatrics
2. Suraj Gupta's Recent Advances in Pediatrics

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Model Question Paper

Paper II-General Pediatrics including neonatology, preventive and social pediatrics

Time: 3 Hrs.

Maximum Marks: 100

1. A 5 year old male child is referred to you for Fever of Unknown Origin

(FUO).How will you evaluate the child to arrive at a correct diagnosis?

(20 marks)

2. Write briefly on :

a. Rh incompatibility

b. Opium poisoning

c. Vesico ureteric reflux

d. Kwashiorkor

(10 x 4=40)

3. Write short notes on :

a. Sideroblastic anemia

b. Chylous ascites

c. 'Soft signs' in neurology

d. Partial anomalous pulmonary venous drainage

(10 x 4 = 40)



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD PATHOLOGY

(Revised with effect from 2019-2020 onwards)

GOAL :

The goal of postgraduate medical education shall be to produce competent specialist.

Who shall recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy;

- (i) Who shall have mastered most of the competencies, retaining to the specialty, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.
- (ii) Who shall be aware of contemporary advances and developments in the discipline concerned.
- (iii) Who shall have acquired a spirit of scientific inquiry and oriented to the principles of research methodology epidemiology and
- (iv) Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

OBJECTIVES:

At the end of the course a candidate must be able to

- (i) Understand and explain about the factors in causation of disease.
- (ii) Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.
- (iii) Understand and explain the basis of evolution of clinical signs and symptoms.
- (iv) Should be able to perform procedures designated for laboratory detection of diseases.
- (v) Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.
- (vi) Should be able to recognize and report morphological changes in cells, tissues and organs.
- (vii) Should be able to plan, perform and report specific research projects.
- (viii) Should be able to perform clinical autopsy and present CPC (Clinico Pathological Correlation)

PROGRAM OUTCOMES

PO1: Recognize the health needs of the community and carry out professional obligation ethically and in keeping with the objectives of the national health policy.

PO2: Master most of the competencies, retaining to the specialty, that are required to be practiced at the secondary and tertiary levels of the healthcare delivery system.

PO3: Be aware of contemporary advances and developments in the discipline concerned.

PO4: Acquire a spirit of scientific inquiry and oriented to the principles of research methodology epidemiology

PO5: Acquire the basic skills in teaching of the medical and paramedical professionals.

PROGRAM SPECIFIC OUTCOMES

PSO1: Understand and explain about the factors in causation of disease.

PSO2: Understand processes involved in the gross and microscopic changes of organs and tissues and explain these changes.

PSO3: Understand and explain the basis of evolution of clinical signs and symptoms.

PSO4: Should be able to perform procedures designated for laboratory detection of diseases.

PSO5: Should be able to process and accurately interpret the representative materials obtained from the patients in order to arrive at a correct diagnosis.

PSO6: Should be able to recognize and report morphological changes in cells, tissues and organs.

PSO7: Should be able to plan, perform and report specific research projects.

PSO8: Should be able to perform clinical autopsy and present CPC (Clinico Pathological Correlation)

METHODS OF TRAINING

Duration of course – 3 years.

(i) On job training

- Histopathology including techniques and reporting
- Cytology including FNAC, fluid cytology , exfoliative cytology- techniques and reporting
- Haematology including blood banking and transfusion medicine- techniques and reporting
- Clinical pathology- techniques and reporting
- Museum techniques
- Autopsy techniques and interpretation
- Serology- techniques and reporting
- Handling of hazardous material
- Handling, maintenance and calibration of instruments used in laboratory
- Undergraduate teaching
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(ii) P.G. Teaching sessions

- Journal review
- Subject seminar
- Grossing discussions for autopsies and surgical material
- Slide seminars including histopathology ,haematology, and cytopathology
- Clinical case- group discussion
- Interdepartmental seminars

Postgraduate students should be encouraged to attend CME, Workshops, Conferences & present papers.

TEACHING /LEARNING CONTENT

A. THEORY

I BASIC SCIENCES

Anatomy/histology of all structures in human body/organs

- Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines
- Genetics-Fundamental / applied aspects
- Biostatistics
- Biomedical ethics-ethical issues related to Medical practice and research

II PATHOLOGY

Historical aspects

- General pathology
- Systemic pathology
- Haematology
- Blood banking and Transfusion Medicine
- Cytopathology
- Clinical Pathology
- Medical autopsy: Techniques and interpretation
- Recent advances in all fields, related to Pathology
- Organization of laboratory including quality control

III CLINICAL BIOCHEMISTRY

Routine biochemical investigations and various organ function tests i.e. LFT, RFT etc.

B. PRACTICAL

Proficiency of technological methods should include the following:

1. Fields in which high degree of professional competence and theoretical knowledge is expected:-

- a) Gross pathology and histopathology
- b) Haematology
- c) Cytopathology
- d) Clinical pathology and Blood banking

2. Fields in which student is expected to achieve reasonable working knowledge and skills to be able to run laboratory services independently

- a) Clinical chemistry
 - b) Clinical Microbiology
- Routine Microbiological investigations including culture & sensitivity

3. Fields in which student is expected to achieve general acquaintance of techniques to understand and interpret data

- a) Immunopathology
- b) Histochemistry
- c) Immunohistochemistry
- d) Cytogenetics
- e) Molecular biology

Division into Courses

Course 1 (General Pathology)

Objectives:

1. Understand response of cells/tissue to various injurious agents
2. Understand the basis of differentiation between benign and malignant tumours
3. Identify different infectious organisms and their tissue reactions
4. Relevance of genetic basis of diseases
5. Understand causes and pathogenesis of disease

Course 2 (Haematology, clinical pathology, cytology, transfusion medicine)

1. Planning of tests, interpretation and diagnosis of haematological diseases
2. Knowledge of automation and quality assurance in Haematology
3. Possess the knowledge necessary for the evaluation and reporting of cytopathology specimens along with ability to independently perform fine needle aspiration of palpable superficial lumps in patients and make good quality smears
4. Have reasonable working knowledge of blood banking
5. Knowledge of principles of all clinical pathology tests and significance of altered values and interpretation

Course 3 (Systemic pathology)

1. Be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and take appropriate tissue sections
2. Be able to correctly diagnose majority of the cases in routine reporting
3. Knowledge of tissue-processing and understanding of the principles of automatic tissue-processing machine
4. Be aware of the technique of autopsy and have sufficient understanding of various disease processes, so that a meaningful clinico-pathological correlation can be made.

Course 4 (Recent advances in Pathology)

1. Familiarity with the principles, procedures and interpretation of various immunohistochemical stains
2. Familiarity with principles and techniques of electron microscopy and the working of an electron microscope
3. Familiarity with importance of statistical methods in assessing data from patient material and experimental studies
4. Understand the principles of molecular testing especially related to the disease processes and theranostic applications in various diseases
5. Knowledge on immunofluorescence techniques especially in kidney and skin biopsies

Soft Skills:

1. Ability to design and implement a research project
2. Competency to interact with/counsel patients and relatives in a proper manner.

3. Fostering proper work culture
4. Ability work as a part of a team
5. Knowledge of principles of biomedical ethics

POSTING SCHEDULE:

- 1) Histopathology – 12 months
- 2) Autopsy - 3 months
- 3) Clinical pathology & Haematology -9 months
- 4) Cytopathology – 6 months
- 5) Blood Bank – 1 month
- 6) Biochemistry : - 15 days
- 7) Microbiology:- 15 days
- 8) Museum :- 15 days
- 9) Revision in all sections :- 31/2 months

TOTAL 36 months(3years)

**RECOMMENDED MINIMUM TEXT BOOKS AND JOURNALS
BOOKS:**

- 1 Cotran, Kumar, Collins. Robin's Pathologic Basis of Disease, published by W.B. Saunders & Company.
- 2.Ivan Damjanov, James Linder. Anderson's Pathology, published by C.V. Mosby Company.
- 3.J. B. Walter, M.S. Israel. General Pathology, published by Churchill Livingstone.
4. Emeritus W.ST. Symmers Systemic Pathology, published by Churchill Livingstone.
5. Juan Rosai, Ackerman's Surgical Pathology, published by C.V. Mosby Company.
6. Leopold G Koss, Diagnostic cytology and its histopathologic basis published by J.B. Lippincott Company.
7. Marluce Bibbo, Comprehensive cytopathology, published by W.B Saunders Company
8. Winnifred Grey, Diagnostic cytopathology, published by Churchill Livingstone
9. Orell, Sterrett- Walters and Whittaker, Fine Needle Aspiration Cytology (Manual & Atlas), published by Churchill Livingstone
10. Greer J.P, Foerster J,Jukens J et. al Wintrobe's Clinical Haematology, published by Lippincott Williams and Wilkins
11. Firkin F , Chesterman C, Penington D, de Gruchy's Clinical Haematology in Medical Practice, published by Blackwell Sciences
12. Henry J.B Clinical Diagnostics and Management by Laboratory Methods. published by W.B. Saunders & Company.
13. Lewis S.M, Bain D.J, Bates I, Dacie & Lewis Practical Haematology published by Churchill Livingstone.
14. Hoffbrand A.V, Catovsky D, Tuddenham G.D, Postgraduate Haematology – published by Blackwell publishing
- 15 R.Anantnarayan , C.K.Paniker, Textbook of Microbiology , published by Orient Longman.

16. Harshmohan ,Textbook of pathology , published by Jaypee.
17. Parasitology (Protozoology & Helminthology.) in relation to clinical medicine – K.D.Chatterjee – published by Chatterjee Medical Publication.
18. Sudha R.Kini ,Colour Atlas of differential diagnosis in exfoliative and aspiration cytopathology , published by Lippincott, Williams & Wilkins.
19. Praful B. Godkar ,Clinical Biochemistry – Principles & practice , published by Bhalani Publishing House, Bombay.
20. Theory & practice of Histological Techniques edited by John . D.Bancroftpublished by Chruchill Livingstone.
21. Enzinger & Weiss, Soft Tissue Tumours, Published by B.I.Publications (India.) C.V.Mosby company.
22. Elder D.E, Lever’s Histopathology of the skin – Published by J.B.Lippincott Company.
23. Novak & Woodruff Edited, Novak’s Gyanaecologic and Obsteric Pathology, published by – Kiaku Shoin/Saunders.
24. Christopher D.M. Fletcher, Diagnostic Histopathology of Tumours Vol.1 & 2- published by Chruchill Livingstone.
25. Recent advances in Histopathology, Haematology, Blood coagulation etc.
26. AFIP, Atlas of tumour pathology.
27. Interpretation of Breast Biopsies - Carter
28. Day D.W, Jass J.R, Price A.B, Morson and Dawson’s Gastrointestinal Patholgy, published by Blackwell publishing .
29. Ellison D, Love S, Chimelli L et. al, Neuropathology , published by Mosby
30. Epstein Prostate Biopsy Interpretation, published by Lippincott- Raven
31. Fogo A.B,Kashgarian M, Diagnostic Atlas of Renal Pathology, published by Elseiver Saunders
32. Foster C.R, Pathology of the Urinary Bladder, published by Saunders
33. Fox H, Wells M ,Haines & Taylor - Obstetric and Gynaecological Pathology, published by Chruchill Livingstone
34. Ioachim H.L,Lymphnode Pathology, published by Lippincott
35. Kilpatrick, Renner, Diagnostic Musculoskeletal Surgical Pathology, Clinicoradiologic & cytologic correlations,published by Saunders
36. Kurman R.J, Blaustein’s pathology of the female genital tract, published by Springer
37. Leslie K.O ,Wick M.R, Practical pulmonary pathology; a Diagnostic approach, published by Churchill Livingstone
38. MacSween, Butt, Portman et al,Pathology of the liver- published by Churchill Livingstone
39. Mills S.E, Sternberg’s diagnostic surgical pathology, published by Lippincott Williams and Wilkins
40. Montgomery E.A, Biopsy interpretation of the Gastrointestinal Tract Mucosa, published by Lippincott Williams and Wilkins
41. Odze R.D, Surgical pathology of the GI Tract, Liver, Biliary Tract and Pancreas, published by Saunders
42. Owen D, Pathology of the Gall Bladder , Biliary Tract, and Pancreas, published by Saunders
43. Pilch B.Z, Head and Neck surgical pathology, published by Lippincott Williams and Wilkins

44. Rosen P, Pathology of Breast, published by Lippincott Williams and Wilkins
45. Silverberg S.G, Atlas of Breast pathology, published by Saunders
46. Weedon ,Skin Pathology, published by Churchill Livingstone
47. Wickremasinghe, Blood and Bone marrow pathology, published by Churchill Livingstone
48. Atkinson B, Atlas of diagnostic pathology, published by Saunders
49. Cibas E.S, Cytology :Diagnostic principles and clinical correlates, published by Saunders
50. Geiinger, Modern cytopathology
51. Naib Z.M,Cytopathology, published by Little Brown and company
52. Meisels A, Morin C, Cytopathology of the uterine Cervix, published by ASCP Press
- 53.Miettinen M, Diagnostic soft tissue pathology, published by Churchill Livingstone
54. Chandler F.W, Pathologic diagnosis of fungal infection, published by ASCP Press
55. Collins R.D, Paediatric Haematopathology, published by Churchill Livingstone
56. Hoffman , Benz, Shattil ,Haematology :Basic principles and practice,published by Churchill Livingstone
57. Naeim F, Atlas of bone marrow and blood pathology, published by W. B Saunders
58. Tkachuk D.C, Atlas of clinical haematology, published by Saunders
59. WHO Classification of tumours, published by IARC Press.
60. Mollison P.L, Blood transfusion in clinical medicine, published by Oxford, ELBS & Blackwell Scientific Publication
61. Chitale A, Pathology of urinary & male genital system for urologists, general surgeons & Pathologists published by B.I. Publications
62. Saran R.K., Transfusion medicine technical manual, published by WHO

JOURNALS:

1. British Journal of Haematology, published by Blackwell Sciences.
2. CANCER, International journal of American Cancer Society, published by John Wile & Sons Inc.
3. Journal of Clinical Pathology, published by B.M.J.
4. Haematology / Oncology Clinics of North America, published by W.B. Saunders & Company.
5. American Journal of Surgical Pathology, published by Lippincott & Raven
6. Indian Journal of Pathology & Microbiology, published by IAPM.
7. Indian Journal of Cancer, published by Indian Cancer Society.
8. Indian Journal of Cytology, published by IAC.
9. LANCET published by Elsevier
10. I.C.M.R. Bulletin, published by ICMR
11. Histopathology , journal of the British Division of the International Academy of Pathology-Published by Blackwell Science
12. Acta Cytologica, The Journal of Clinical Cytology and Cytopathology
13. Archives of Pathology and Laboratory Medicine-Published by American Medical Association
14. Human Pathology- Published by W.B. Saunders & Company.
15. American Journal of Clinical Pathology published by ASCP
16. Indian Journal of Cytology
17. WHO Bulletin published by WHO
18. Indian Journal of Urology
19. Modern Pathology

20. Indian journal of Leprosy published by Indian Leprosy Association
21. New England Journal of Medicine published by Massachusetts Medical Society

ADDITIONAL READINGS:

1. Compendium of recommendations of various committees on health and development (1943 to 1975) DGHS, 1985 Central Bureau of Health Intelligence, DGHS, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335.
2. National Health Policy, Ministry of Health & Family Welfare, Govt. of India, Nirman Bhavan, New Delhi-335. 1983.
3. ICMR, Policy, Statement of ethical considerations involved in research on Human subjects, 1982 ICMR, New Delhi.
4. Code of Medical Ethics framed under Section- 33 of Indian Medical Council Act , 1956 . MCI, Kotla road, New Delhi.
5. Santosh Kumar, The elements of Research ,writing and editing 1994,Dept. of Urology,JIPMER,Pondicherry
6. Srinivas D.K et al , Medical Education Principles and Practices,1995.National Teacher Training Centres, JIPMER, Pondicherry
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8. Indian National Science Academy, Guidelines for care and use of animals in scientific research, New Delhi,1994
9. International Committee of Medical Journal Editors, Uniform Requirements for manuscripts submitted to biomedical journal. N. Engl J Med 1991;424-8
- 10.Kirkwood B.R. Essentials of Medical Statistics, 1st ed. Oxford Blackwell Scientific Publications 1988
- 11.Mahajan B.K.Methods in Biostatistics for medical students,5th ed New Delhi, Jaypee Brothers Medical Publishers,1989
- 12.Raveendran B. Gitanjali, A Practical Approach to PG dissertation, New Delhi.J.P Publications 1998.

Student's Record Book
M.D (Pathology)
DEPARTMENT OF PATHOLOGY

Name of the Student :Dr.

Name of the Institute & Address:

ABOUT THE LOG BOOK:

The log book has been prepared to maintain a record of academic and service activities of postgraduates and to provide an account of progress made by him/her. Maintenance of

such log books will also allow a review of training programme and incorporation of improvements in the programme. Postgraduates are required to carry the log book and get the entries made regularly. Faculty is requested to countersign. Log books have to be submitted to the head of the department before submitting the final examination form.

PERSONAL BIO-DATA

Name of the Student :

Date of joining :

Probable date of appearing for Examination :

Date of Birth :

M.B.B.S from :

Year of passing MBBS :

Name of the State Medical Council :

Registration No with date :

Permanent Address :

PIN : Phone No. : ()

Local Guardian's Address :

PIN Phone No. : ()

POSTING SCHEDULE :

SECTION

MONTH & YEAR

From...

To.....

REMARKS

SIGNATURE OF SECTION I/C

**Clinical Pathology
Cytopathology
Haematology
Blood Banking
Histopathology**

**Autopsy
Biochemistry
Serology
Museum**

Revision in all sections

ATTENDANCE AT P.G. TEACHING SESSIONS:

Month & Year	No. of Teaching Programmes Held	No. of Teaching Programmes attended

Remarks :

Signature of P.G. Teaching I/C

PARTICIPATION IN P.G. TEACHING ACTIVITY

Subject Seminars presented	Date	Topic

Remarks:

Signature of faculty

Journal Articles presented	Date	Topic

Remarks:

Signature of faculty

Group discussion of clinical cases	Date	Topic

Remarks:

Signature of faculty

Slide Seminars presented/participated:	Date	Topic

Remarks:

Signature of faculty

SCIENTIFIC CONTRIBUTIONS

CME/ Workshops attended :

No.	Name of CME/ Workshop Held	Dates

No.	Conferences attended	Dates

Name of Conference Paper presented - Yes/No

If yes, title of paper Publications:

- 1.
- 2.

Awards:

CERTIFICATE

This is to certify that Dr. has completed the tenure for M.D. satisfactorily.

P.G.Teacher Programme Incharge

**P.G.Teaching
Professor & Head**

EVALUATION SYSTEM

A. DISSERTATION

a) Thesis / Dissertation is compulsory. Every candidate is required to carry out the work on a selected research project under the guidance of a recognized post graduate teacher. The results of such work shall be submitted in the form of a Dissertation.

b) The Dissertation is aimed at training the candidate in research methods and techniques. It includes identification of a problem , formulation of a hypothesis , search and review of relevant literature, getting acquaintance with recent advances, designing of research study , collection of data, critical analysis of results and drawing conclusions.

c) The title of the topic along with the plan of work not exceeding 500 words in prescribed proforma should be submitted to the University with the recommendation of guide through proper channel within a period of 3 months from the date of registration for the postgraduate course. There should not be an overlap of topic, cases, material or the related data among the candidates within the department during the period of actual Dissertation work. Prior approval by the local Ethical Committee is essential .

Unless communicated otherwise within a period of 2 months from the date of receipt of plan of work by University, it shall be assumed that topic of Dissertation is approved and no communication is necessary in this regard. The last date for submission will not be extended without prior permission from the University. In case of delay in submission of topic of Dissertation and plan of work, the period of training of the candidate will be proportionately extended for which the entire responsibility shall be upon the candidate .

d) The volume of the Dissertation should be reasonable and may vary depending on the topic. The bibliography should be as per Vancouver system.

e) Four copies of the Dissertation complete in all respect certified by the guide should be submitted to the University through proper channel 6 months before the final examinations to the registrar. (evaluation)

f) The identity of the candidate/ teacher/ Department /College / Place should not be disclosed in the Dissertation. Acknowledgement should not be included in the Dissertation.

g) Certificates issued by guide, countersigned by Head of the Department and the Dean certifying, therein that the work done by the candidate has been carried out under the supervision of the guide to his/her entire satisfaction, should be submitted separately to the University.

h) Dissertation approval is a prerequisite for appearing at the University exam. In case the Dissertation, is not accepted, the same shall be communicated to the candidate along with reasons for rejection at least 2 months prior to the commencement of theory exam.

i) The candidate may make necessary corrections and resubmit the Dissertation at least 1 month prior to the commencement of theory exam.

B. LOG BOOK (Work diary)

The postgraduate students should include all their activities in the log book. The annual assessment based on the work diary shall be done by the guide, teacher in charge of postgraduate teaching programme and HOD.

C. COURSES

Course - I General Pathology (U19MDPA01)

CO1: Understand response of cells/tissue to various injurious agents

CO2: Understand the basis of differentiation between benign and malignant tumours

CO3: Identify different infectious organisms and their tissue reactions

CO4: Relevance of genetic basis of diseases

CO5: Understand causes and pathogenesis of disease

BASIC SCIENCES

Anatomy/histology of all structures in human body/organs

- **Physiology and biochemistry-Basic aspects of various metabolism and functioning of endocrines**
- Genetics-Fundamental / applied aspects
- Biostatistics
- Biomedical ethics-ethical issues related to Medical practice and research

Course - II Haematology, Clinical Pathology, Cytology and Transfusion Medicine(U19MDPA02)

CO1: Planning of tests, interpretation and diagnosis of haematological diseases

CO2: Knowledge of automation and quality assurance in Haematology

CO3: Possess the knowledge necessary for the evaluation and reporting of cytopathology specimens along with ability to independently perform fine needle aspiration of palpable superficial lumps in patients and make good quality smears

CO4: Have reasonable working knowledge of blood banking

CO5: Knowledge of principles of all clinical pathology tests and significance of altered values and interpretation

Planning of tests, interpretation and diagnosis of haematological diseases

Knowledge of automation and quality assurance in Haematology

Possess the knowledge necessary for the evaluation and reporting of cytopathology specimens along with ability to independently perform fine needle aspiration of palpable superficial lumps in patients and make good quality smears

Diagnosis based on peripheral smears

Have reasonable working knowledge of blood banking

Knowledge about transfusion reactions

Knowledge about frozen section and its staining techniques

Knowledge of principles of all clinical pathology tests and significance of altered values and interpretation

Course - III Systemic Pathology (U19MDPA03)

CO1: Be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and take appropriate tissue sections

CO2: Be able to correctly diagnose majority of the cases in routine reporting

CO3: Knowledge of tissue-processing and understanding of the principles of automatic tissue-processing machine

CO4: Be aware of the technique of autopsy and have sufficient understanding of various disease processes, so that a meaningful clinico-pathological correlation can be made

Be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens and take appropriate tissue sections

Clinical correlation of the pathology findings and the symptoms of the patient in reaching the diagnosis of the patient

Different staining methods used

Be able to correctly diagnose majority of the cases in routine reporting

Knowledge of tissue-processing and understanding of the principles of automatic tissue-processing machine

Be aware of the technique of autopsy and have sufficient understanding of various disease processes, so that a meaningful clinico-pathological correlation can be made.

Course - IV Recent Advances in Pathology (U19MDPA04)

CO1: Familiarity with the principles, procedures and interpretation of various immunohistochemical stains

CO2: Familiarity with principles and techniques of electron microscopy and the working of an electron microscope

CO3: Familiarity with importance of statistical methods in assessing data from patient material and experimental studies

CO4: Understand the principles of molecular testing especially related to the disease processes and theranostic applications in various diseases

CO5: Knowledge on immunofluorescence techniques especially in kidney and skin biopsies

Familiarity with the principles, procedures and interpretation of various immunohistochemical stains

Familiarity with principles and techniques of electron microscopy and the working of an electron microscope

Familiarity with importance of statistical methods in assessing data from patient material and experimental studies

Understand the principles of molecular testing especially related to the disease processes and theranostic applications in various diseases

Knowledge on immunofluorescence techniques especially in kidney and skin biopsies

Course V Soft Skills (U19MDPA05) - Elective Course

CO1: Ability to design and implement a research project.

CO2: Competency to interact with/counsel patients and relatives in a proper manner.

CO3: Fostering proper work culture.

CO4: Ability work as a part of a team.

CO5: Knowledge of principles of biomedical ethics.

D. UNIVERSITY EXAMINATION

The university examination will comprise of theory and practical. To be eligible to be declared as successful in the PG Degree examination it is compulsory for the candidate to pass in theory and practical examination separately in the same attempt.

a) Theory examination:

There shall be four question papers, each of three hours duration. Each paper will be of 100 marks. Minimum passing percentage is 50%

Paper I- General Pathology

Paper II- Haematology, Clinical pathology, Cytology & Transfusion Medicine, .

Paper III- Systemic Pathology

Paper IV- Recent Advances in Pathology

Each paper will consist of

2 LAQs of 20 marks each - 40

6 SAQs of 10 marks each – 60

Total 100 marks

Marking Pattern for Theory Examination

Marks for individual Paper

question

Q1	LAQ1	20 marks
Q2	LAQ2	20 marks
Q3 –Q8- 6 SN		10 marks each

Minimum passing marks 200

Total Marks 400

The candidate should score minimum 200 out of total 400 marks in theory i.e 50%

b) Practical Examination Duration – 3 days

DAY 1 :

i) Clinical case will include Total 75 marks

- urine examination - **20**
- haemogram - **20**
- special haematology test-1 – **20**
- case discussion – **15**

ii) Reconstructed autopsy - 20 marks

iii) Gross/ Morbid Anatomy - 30 marks

iv) Haematology and Cytology 15 slides - 75 marks

(8 & 7 slides respectively, five minutes duration for each slide.)

DAY 2 :

i) Histopathology slides- 25 slides- 125 marks

(the candidate should be assessed so as to evaluate performance in identifying common as well as rare lesions).Five minutes duration for each slide.

ii) Histopathological Techniques 20 marks

- 1) Block cutting
- 2) Staining- H & E & Pap
- 3) Special stain- 1

DAY 3

i) Teaching : 15 marks

ii) Viva Voce :- 40 marks

Student will be examined by all the examiners together, about students' subject knowledge, comprehension, analytical approach, expression and interpretation of data, and will include discussion related to dissertation.

Marking scheme for practical examination

Sr. No.	Exercises	Maximum marks
1	Histopathology slides	125
2	Clinical case	75
3	Haematology & Cytology slides	75
4	Grossing	30
5	Structured Autopsy	20

6	Histotechniques	20
7	Teaching	15
8	Viva Voice	40

Total marks 400

Final marking scheme for MD examination in Pathology

<u>Heads of Passing</u>	<u>'Max Marks'</u>	<u>Min marks for passing</u>
Theory	400	200
Practical and viva voce	400	200



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

MD- PHARMACOLOGY

(Revised with effect from 2019-2020 onwards)

Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training.

Pharmacology consists of both the experimental (basic) and clinical sciences. Experimental pharmacology is essential to understanding of drug action in diseases as well as for the pharmaceutical industry for drug discovery and development. Clinical pharmacology is essential for prescribing practice in medicine, adverse drug reactions, clinical trial and pharmacovigilance. The job prospects for a medical pharmacologist are in academics, pharmaceutical industry/clinical research organization, government research institutions, in regulatory bodies and as scientific writer or science manager. Accordingly, a post graduate (MD) student in Pharmacology should be competent to meet the job requirements at all these places.

The applied nature of the discipline, the move towards integrated course structures, the widening of discipline boundaries and increasing number of students seeking post graduation degree raise issues concerning maintaining and improving competency as along with maintenance of academic standards. These issues also necessitate integration with other biomedical and clinical disciplines. A pragmatic approach to postgraduate pharmacology teaching in India is an important step towards addressing the aforesaid challenges and facilitating a fresh curriculum design.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of the Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

SUBJECT SPECIFIC LEARNING OBJECTIVES

At the end of the MD training programme in Pharmacology, the student should acquire competencies in the following areas:

1. Acquisition of knowledge

The student should be able to explain clearly concepts and principles of Pharmacology and therapeutics. The student should also be able to explain the drug development processes. S/he should be able to explain Drugs and Cosmetics Act, in addition to clinical trial procedures.

2. Teaching and training

The student should be able to effectively teach undergraduate students in medicine (MBBS) and allied health science courses (Dentistry and Nursing) so they become competent healthcare professionals and able to contribute to training of postgraduate trainees.

3. Research

The student should be able to carry out a research project (both basic and clinical) from planning to publication and be able to pursue academic interests and continue life-long learning to become more experienced in all the above areas and to eventually be able to guide postgraduates in their thesis work.

SUBJECT SPECIFIC COMPETENCIES

The student during the training program should acquire the following competencies:

A. Cognitive domain

1. Describe and apply pharmacological principles to explain the mechanism/s of the effects of drugs used in diagnosis, prevention and treatment of diseases of all systems of human body.
2. Explain pharmacodynamics and pharmacokinetics of drugs.
3. Describe mechanisms of drug-drug interactions and their clinical importance.
4. Apply and integrate knowledge of pathophysiology of diseases and its modulation by drugs.
5. Acquire knowledge on pharmacogenetics and pharmacogenomics
6. Acquire knowledge on principles of pharmacoeconomics
7. Acquire knowledge on pharmacoepidemiology, including drug utilization studies.
8. Acquire knowledge and understanding of principles of Good clinical practice (GCP) and Good laboratory practice (GLP) guidelines
9. Acquire knowledge on essential medicines
10. Acquire knowledge on pharmacovigilance

11. Acquire knowledge and apply the principle of biostatistics in the evaluation and interpretation of drug safety and efficacy studies
12. Describe how to evaluate, analyse and monitor preclinical and clinical data in drug discovery
13. Able to integrate principles of immunology in biochemistry.
14. Demonstrate knowledge of basics of research methodology, develop a research protocol, conduct the study, record experimental observations, analyse data using currently available statistical software, interpret results and disseminate these results and to have the potential ability to pursue further specializations and eventually be competent to guide students.
15. Describe the principles of teaching - learning technology towards application and take interactive classroom lectures, modules for problem based learning (PBL), case discussions, small group discussions, seminars, Journal club and research presentations
16. Demonstrate knowledge about computer assisted learning (CAL) softwares and ability to use them efficiently to promote learning of pharmacology.
17. Demonstrate knowledge of principles of Instrumentation.
18. Demonstrate knowledge about recent advances and trends in research in the field of pharmacology and clinical pharmacology.
19. Acquire knowledge on generic drugs and generic prescription.
20. Acquire knowledge on rational use of drugs and prescription auditing
21. Acquire knowledge about antimicrobial stewardship programs and strategies for containment of antibiotic resistance
22. Acquire knowledge on animal toxicity studies
23. Acquire knowledge on common poisoning
24. Acquire knowledge on the legal and ethical issues involved in drug development and research.
25. Acquire knowledge in Biostatistics including use of statistical softwares :
 - Estimation Sample size for a clinical trial
 - Scales of measurement, data display, measures of central tendency (mean, median, mode)
 - Dispersion of data (variance, standard deviation)
 - Selection of tests (of significance) and their applicability

- Correlation and regression analysis
- Basics of systematic reviews and meta-analysis

B. Affective domain

1. Effectively explain to patients, the effects and side effects of drugs, including the need for medication adherence.
2. Communicate effectively with pharmacological reasoning with students, peers, staff and faculty, and other members of the health care team on rational use of drugs and improving spontaneous reporting of adverse events.
3. Demonstrate respect in interactions with peers, and other healthcare professionals.
4. Demonstrate ethical behavior and integrity in one's work.
5. Demonstrate ability to generate awareness about the use of generic drugs in patients.
6. Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills, expertise and perpetual professional development.

C. Psychomotor domain

1. Able to predict efficacy and adverse effects associated with use of drugs, along with causality assessment.
2. Demonstrate skills for prescription writing.
3. Perform major in vivo and in vitro animal experiments.
4. Observe and understand basic principles of working of important advanced techniques, like High Performance Liquid Chromatography (HPLC).
5. Demonstrate standard operating procedures of various methods and techniques used in clinical trials and research.
6. Determine levels of common poisons in blood
7. Demonstrate presentation skills at academic meetings, publications and writing research projects for funding agencies.
8. Be able to analyze and evaluate a research paper

By the end of the course, the trainee should have acquired practical skills in the following:

1. In vivo and ex vivo experiments, like organ bath, analgesiometer, physiography/polygraph, convulsimeter, plethysmograph, learning and memory, models for affective disorders.
2. Administration of drugs by various routes (subcutaneous, intravenous, intraperitoneal) in experimental animals
3. Collection of blood samples and oral gavage in experimental animals
4. Preparation and administration of a drug solution in appropriate strength and volume
5. Experiments to show dose response curve of agonists (in the presence or absence of an antagonist) on various biological tissues, like
 - i) Isolated rabbit/rat/ guinea-pig intestine
 - ii) Isolated rat uterus
6. Determination of EC₅₀, ED₅₀, pD₂ and pA₂ values of drugs
7. Perform in vivo experiments to study effect of mydriatics and miotics on rabbit eye
8. Perform in vivo experiments to study effect of antiepileptic drugs using animal models of epilepsy
9. Perform in vivo experiments to study effect of analgesics using animal models of analgesia
10. Perform in vivo experiments to study effects of drugs on learning, memory and motor coordination
11. Estimate toxic drug levels using chemical and biological tests (alkaloids, glycosides, steroids, barbiturates, salicylates) by commonly used methods)
12. Clinical pharmacology
 - i) Prepare protocol for a clinical trial
 - ii) Prepare Informed consent form and participant information sheet for research involving human participants
 - iii) Report Serious Adverse Effect (SAE)
 - iv) Evaluate promotional drug literature
 - v) Prepare “Drug Information Sheet” (WHO criteria)
 - vi) Interpret bioavailability parameters with the help of given pharmacokinetics data

vii) Perform causality assessment and report ADR as per Pharmacovigilance Programme of India (PvPI)

Animal Experiments: All animal experiments must be compliant with Govt. of India regulations, notified from time to time. Amphibian/Dog/Cat experiments should be conducted by computer assisted simulation models/ facilities. Other experiments should be performed as permissible by CPCSEA guidelines

Syllabus

The course contents should cover the following broad topics:

1. Basic and molecular pharmacology
2. Drug receptors and Pharmacodynamics
3. Pharmacokinetics (Absorption, Distribution, Metabolism and Excretion)
4. Biotransformation
5. Pharmacogenomics and Pharmacogenetics
6. Autonomic Pharmacology
7. Drugs acting on Smooth muscles
8. Clinical pharmacology
9. Drug development and Regulations
10. Clinical Pharmacokinetics
11. Drugs acting on Synaptic and Neuroeffector Junctional sites
12. Drugs acting on Central Nervous System (Sedative, Hypnotics, Antiepileptics, General Anesthetics, Local Anesthetics, Skeletal Muscle Relaxants, Antipsychotic, Antidepressants, Drugs used in Parkinson's disease and other neurodegenerative disorders, opioid agonists and antagonists, Drugs of abuse)
13. Drugs modifying renal function
14. Drugs acting on cardiovascular system and haemostatic mechanisms (Antihypertensives, Antianginal, Antiarrhythmics, Drugs used in heart failure, Drugs used in Dyslipidemias, Fibrinolytics, Anticoagulants, Antiplatelets)

15. Reproductive Pharmacology
16. Agents effecting calcification and bone turnover
17. Autacoids and related pharmacological agents (NSAIDs) and drugs used in Rheumatoid arthritis and Gout
18. Gastrointestinal drugs
19. Pharmacology of drugs affecting the respiratory system (drugs used in Bronchial Asthma and COPD)
20. Antimicrobial, antiparasitics, disinfectants, antiseptics
21. Chemotherapy of neoplastic disease
22. Antiviral drugs
23. Drugs used in Autoimmune disorder and Graft versus Host Disease)
24. Dermatological pharmacology
25. Ocular pharmacology
26. Use of drugs in pregnancy
27. Perinatal and Pediatric Pharmacology
28. Geriatric Pharmacology
29. Immunomodulators - immunosuppressants and immunostimulants
30. Pharmacology of drugs used in endocrine disorders (drugs used in diabetes mellitus, hypothalamic and pituitary hormones, thyroid and antithyroid drugs, adrenocorticoid hormones and their antagonists, gonadal hormones and their inhibitors)
31. Drug delivery systems
32. Heavy metal poisoning
33. Non-metallic toxicants - air pollutants, pesticides etc.
34. Research methodology and biostatistics
35. Literature search.
36. Pharmacogenomics, Pharmacovigilance (ADR reporting), pharmacoeconomics (cost-effectiveness study) and pharmacoepidemiology
37. Over the counter drugs
38. Dietary supplements and herbal medicines

39. Pharmacometrics - methods of drug evaluation.

40. General screening and evaluation of:

- Analgesics, antipyretics, anticonvulsants, anti-inflammatory drugs, antidepressants, antianxiety and antipsychotics, sedatives, muscle

relaxants, antihypertensives, hypocholesterolaemic agents, anti-arrhythmics, diuretics, adrenergic blocking drugs

- Drugs used in peptic ulcer diseases/Prokinetic agents/ antiemetics
- Antitussives, /anti-asthma agents
- Local Anaesthetics
- Oxytocics, antifertility agents
- Antidiabetics

Behavioral pharmacology models and evaluation of drugs affecting learning and memory

41. Bioassays

- Bioassay methods
- Animal experiments: Ethical considerations, ethical approval, applicable regulatory Guidelines (CPCSEA), humane animal research (principles of 3Rs) and alternatives to animal experimentation. General and statistical considerations
- Anesthetics used in laboratory animals
- Principles of EC₅₀, ED₅₀, pD₂ and pA₂ values of drugs
- Describe methods of bioassay for estimation of :

Acetylcholine, skeletal neuromuscular junction blockers, adrenaline, noradrenaline, histamine, 5 HT, hormones, insulin, vasopressin/oxytocin, estrogen, progestins, ACTH

- Competitive antagonism - pA₂ values
- Immunoassays: Concept, types of bioassays and their application/s
- Animal experiments: Ethical consideration, ethical approval
- Regulatory Guidelines (CPCSEA) and alternatives to animal experimentation

42. Biochemical Pharmacology

- Basic principles and applications of simple analytical methods

- Principles of quantitative estimation of drugs, endogenous compounds and poisons using Colorimetry, Spectrophotometry, flame photometry, High Performance Liquid Chromatography (HPLC) and enzyme-linked immunosorbent assay (ELISA).

TEACHING AND LEARNING METHODS

Postgraduate teaching programme Teaching methodology

Learning in a PG program is primarily self-directed and in Pharmacology consists of laboratory and academic work. The formal sessions are merely meant to supplement this core effort. Acquisition of practical competencies thus becomes the cornerstone of postgraduate medical education in Pharmacology.

Formal teaching sessions

- In addition to laboratory work, at least 6-hr of formal teaching per week is necessary. The departments may select a mix of the following sessions:

Journal club Once a week

Seminar Once a week

Practical Once a week

Group Discussions Once a week

Case discussions Once a month

Interdepartmental case or seminar Once a month

Note: These sessions may be organized as an institutional activity for all postgraduates.

- Attend accredited scientific meetings (CME, symposia, and conferences).
- A postgraduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
- Additional sessions on basic sciences, biostatistics, research methodology, teaching methodology, hospital waste management, health economics, medical ethics and legal issues related to experimentation are suggested.

- There should be a training program on Research methodology for existing faculty to build capacity to guide research and for keeping abreast with rapidly evolving methods and techniques in related disciplines.
- The postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- Log book: During the training period, the post graduate student should maintain a Log Book giving details of experimentation done and skills acquired. The log book shall be used to aid the internal evaluation of the student. The Log books shall be checked and assessed periodically by the faculty members imparting the training.
- Department should encourage e-learning activities.

The postgraduate student in M.D (Pharmacology) shall undergo a 3 - year (6 terms of 6 months each) training that will comprise of the following:

I Theory: (lectures, seminars, group discussion, journal club) (at least 6 hours a week, daily 2 hours for 3 days)

II Rotation:

Practical training in the following suggested areas: (8 hours a week, daily 4 hours for 2 days)

- Experimental Pharmacology:

In vitro (including bioassays), in vivo (including common methods of drug evaluation) experiments, computer simulations and toxicity tests

- Chemical Pharmacology:

Identification of drug/toxin by using chemical, biological and analytical tests. Quantitative estimation - Use of colorimeter, spectrophotometer and/or other advanced analytical equipments

- Clinical Pharmacology:

I Evaluation of drugs in healthy volunteers as well as patients II Critical evaluation of drug literature, pharmacoconomics,

pharmacovigilance and pharmacoepidemiology.

III Thesis on a suitable problem

IV Training in undergraduate teaching V Computer training

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in medical colleges is mandatory.

ASSESSMENT

FORMATIVE ASSESSMENT

ie., assessment during the training

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD training should be based on:

1. Journal based / recent advances learning
2. Patient based /Laboratory or Skill based learning
3. Self directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I)

SUMMATIVE ASSESSMENT, ie., assessment at the end of training

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The post graduate examination shall be in three parts

1. Thesis

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory examination:

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There shall be four theory papers:

Paper I: General Pharmacology (U19PHA01)

Paper II: Clinical Pharmacology (U19PHA02)

Paper III: Systemic Pharmacology (U19PHA03)

Paper IV: Recent Advances in Pharmacology (U19PHA04)

3. Practical/clinical and Oral/viva voce examination Practical:

a) Long Experiment:

Demonstrating effects of drugs/interpretation of results in anesthetized animal Table exercise
- Examples are given below:

- Calculating pharmacokinetic parameters

- Statistical exercise
- Critical appraisal of a published paper (abstract writing of a published paper)
- Evaluation of drug literature.
- Protocol designing
- ADR reporting and causality assessment
- Assessment of preclinical toxicity data
- Analysis of rational and irrational formulations

b) Short experiment

a. Isolated tissue experiment (Bioassay of drugs) (as per Govt regulations)

Or

interpretation of results of a previous tracing

b. In vivo experiment

c) Spotting exercises: Various drug delivery systems, inhalers, insulin syringe, drip chamber, various tablets, etc.

Oral/Viva voce Examination

Microteaching (teaching exercise) Discussion on dissertation

Principles of general and systemic pharmacology Recent advances in pharmacology & drug therapy

Recommended Reading Material Books (latest edition)

1. Goodman & Gilman's The Pharmacological Basis of Therapeutics, ed. Laurence Brunton, Bruce A. Chabner, Bjorn Knollman.
2. Essentials of Medical Pharmacology, by KD Tripathi
3. Basic and Clinical Pharmacology, by Bertram G. Katzung and Anthony J. Trevor

4. Drug Discovery and Evaluation: Pharmacological Assays Editors: Vogel, Hans
Clinical Pharmacology by Laurence, Bennett and Brown
6. Rang and Dale's Pharmacology by H.P. Rang
7. Koda Kimble and Youngs Applied Therapeutics by Brian K Alldredge and Robin L
Corelli

Journals

03-international Journals and 02 national (all indexed) journals

Pre/Para/Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM.....TO.....

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications

Yes/ No

Remarks* _____

***REMARKS:** Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM MD PHYSIOLOGY

)Revised with effect from 2019-2020 onwards)

GOAL

The goal of postgraduate Medical education in Physiology shall be to produce competent medical teachers who shall –

1. Perform the professional obligations ethically and in keeping with the objectives of National Health Policy.
2. Have acquired the basic skills in teaching medical and para medical students.
3. Be aware of the contemporary advances and developments in Physiology.
4. Have acquired a spirit of scientific enquiry and are oriented to the principles of research methodology.

OBJECTIVES

The candidate, upon successfully qualifying in MD Physiology examination, should be-

1. A competent Physiologist
2. Able to effectively teach medical and paramedical students the basic physiological mechanisms of human body with reference to their implications in the pathogenesis of diseases (patho physiology) and the physiological basis of their management.
3. Able to conduct such clinical/experimental research as would have significant bearing on human health and patient care and also able to publish research papers.
4. Acquire skills in conducting collaborative research in the field of Physiology and allied sciences.
5. Able to demonstrate to the students that the knowledge of physiology can be used in a variety of clinical settings to solve diagnostic and therapeutic problems.
6. Encourage students to participate in workshops/seminars/journal clubs/ demonstrations in allied departments to acquire skills for collaborative research.

PROGRAM OUTCOMES

PO1 Possess comprehensive knowledge of the normal functions of all organ systems of the body

PO2 Possess an understanding of the physiological basis of health and disease.

PO3 Understanding of the basic biophysical principles involved in functioning of body organs in normal and diseased conditions

PO4 Ability to explain the normal functioning of all organ systems in human body and its alterations in diseased state, correlating the same with classical clinical features and outline the basic principles of management.

PO5 Ability to perform detailed clinical examination of each system in a systematic manner and interpret the findings.

PO6 Ability to perform all basic haematology laboratory tests and interpret the results and outline the possible causes for the abnormal results.

PO7 Demonstrate high level critical thinking skills and applying acquired knowledge in solving problems

PO8 Ability to ask correct research questions and design and conduct research work and publish

PROGRAM SPECIFIC OUTCOMES

PSO1 Ability to explain functional anatomy of all organs and organ systems, specific function of each and the role of homeostasis.

PSO2 Knowledge of the interactions of different organ system for well-coordinated total body functions (maintenance of milieu interior)

PSO3 Ability to outline the basic physiological responses and adaptations to changes in external and internal environment .

PSO4 Ability to record, analyze and interpret human physiology experiments like BP, ECG, Spirogram, Audiogram, Stethography, Perimetry, Physiograph and interpret basic abnormalities.

PSO5 Ability to perform technical aspects of all lab tests in hematology and principles underlying the test.

PSO6 Ability to draw and explain amphibian skeletal and cardiac muscle graph

SYLLABUS - THEORY

I. General Physiology

General and Cellular Basis of Human Physiology

Organisation of body fluids.

Functional morphology of cell

Transport across cell membrane & capillary wall

Intercellular communications

Genetics and Gene therapy

Homeostasis, Bio electric potentials

2. Haematology

Composition & functions of blood, functions of plasma proteins.

The functional basis of different formed elements of blood. Elaborate on the current concepts of hemopoiesis, abnormalities in the RBC function with the functional basis of anaemias, the abnormalities in WBC, the basis of the various types of immunological responses in the human body and the mechanisms of regulation of immune responses, abnormalities in platelet functions, haemostatic mechanisms in health and disease.

Current trends in the classification of various blood groups & physiological considerations in blood transfusion

Blood volume.

Lymph & tissue fluid.

3. Nerve Muscle Physiology

Major historical landmarks in the development of current concepts of nerve muscle physiology.

Nerve Cells- Structure, properties and function, Classification of fibre types

Bioelectric potentials, CRO

Nerve degeneration & regeneration

Mixed Nerve – properties

Synapse – properties and functions

Neuroglia

Skeletal muscle- Physiological anatomy of skeletal muscle, Molecular mechanism of muscle contraction, types of contraction, length tension relationship.

Electrical Phenomena & ionic fluxes, energy sources and metabolism

Properties of muscle in intact organism

Motor unit, effects of denervation, EMG and its applications.

Cardiac muscle – Functional anatomy, electrical properties, mechanical properties, length tension relationship. Conducting system of heart and its electrical properties
Smooth muscle – Morphology, Types, electrical & mechanical properties, control of smooth muscle contraction, length - tension relationship, plasticity.
Neuromuscular Physiology, diseases affecting neuromuscular junction.

4. Nervous System

Importance of evolution and development

The contributions of neurophysiologists who have led to the development of the present status of neurophysiology

Various methods used for the study of neurophysiology

Organisation of the nervous system

Sensory System Receptors, Pathways, thalamus, cortical Sensory areas.
Important abnormalities of pain & other somatic sensation.

Motor System Motor functions of spinal cord and spinal cord reflexes
Cortical and brainstem control of motor function
Cerebellum. Basal ganglia and overall motor control
Cerebral cortex, Motor & Sensory dysfunction at different levels.
Vestibular apparatus and equilibrium, posture & movement
Neurotransmitters

Autonomic Nervous System

Hypothalamus, Limbic System

Speech, Memory, Learning, Behaviour, Conditioned reflexes.

Sleep and electrical activities of brain

Cerebrospinal fluid

5. Special Senses

Olfaction, Gustation, Vision, Audition.

6. Cardiovascular System

Organisation of CVS, Origin and spread of cardiac impulse

Cardiac Cycle – Normal electrical and mechanical events & their abnormalities.

Cardiac output, Haemodynamics

Blood pressure & its regulation.

Regional circulation including lymphatic circulation, foetal circulation.

Shock, cardiopulmonary adjustments in health and disease.

Basic principles in the assessment of CVS function.

7. Respiratory System

Functional Anatomy of Respiratory System

Respiratory movements & muscles involved in it. Bronchial tone.

Mechanics of Pulmonary Ventilation - Spirometry - Lung volumes & capacities.

Pressures during the breathing cycle, elastic properties of lung, compliance of lung & chest wall, alveolar surface tension, work of breathing, airway resistance.

Ventilation & Perfusion, Pulmonary Ventilation, Alveolar ventilation, Dead space, Pulmonary blood flow, Ventilation Perfusion Ratio.

Composition of respiratory gases.

Respiratory Membrane, Physics of Diffusion.

Transport of Gases - Transport of Oxygen, Oxygen Dissociation curve and factors affecting it. Carbondioxide transport, CO₂ dissociation curve

Myoglobin & foetal haemoglobin

Regulation of respiration

Respiratory adjustments in health & disease – Including high altitude Physiology & Acclimatisation

O₂ therapy, Use of Ventilators, artificial respiration.

8. Environmental Physiology

Thermo regulatory mechanism in the body and their behaviors in acute & chronic thermal stress.

Effects of exposure to hypo & hyperbaric environment

Acclimatization process

Effects of 'G' forces

Mechanism related to biological rhythm & their role in normal state of body function.

Effect of different types of environmental pollutants on the body.

9. Gastro Intestinal System

Nutrition & metabolism, energy balance

Functional anatomy of GIT

Secretions of GIT and associated glands and their regulation

Movements of GIT

Digestion and Absorption

Describe the basis of evaluation of metabolic functions in health and disease with special reference to liver function tests.

Gastro intestinal hormones, disorders of gastrointestinal function.

10. Endocrinology

Synthesis & secretion, transport, metabolism, mode of action and estimation of various hormones secreted by the endocrine glands.

The neurohumoral mechanisms involved in regulation of hormonal secretions and their mechanism of action at cellular level.

Changes that occur in body as a result of hypo and hyper function of different glands and their hormonal interactions correlating with the function tests.

Bone physiology and calcium metabolism

Endocrine functions of other organs.

Growth, development and ageing.

11. Reproductive System

Development and functions of gonads

Sex differentiation and their abnormalities

Male reproductive system

Female reproductive system

Puberty, Menopause

Pregnancy, Lactation, Contraception

Infertility & its management

12. Excretory System

Functional anatomy of kidney and the basic principles involved in the secretory and excretory function of kidney.

Evaluate the role of kidney in fluid and electrolyte homeostasis & acid - base balance.

The physiological basis of evaluation of renal functions in health and disease.

Principles of dialysis.

Physiological basis of diuretic action

Renal transplantation.

Skin & temperature regulation

SYLLABUS - PRACTICAL

1. Haematology

Haemocytometry - Counts of various cells in the blood i.e. RBC, WBC, eosinophils, platelets and reticulocytes.

Make, stain & report on a peripheral smear & do differential count of WBCs

Haemoglobinometry, PCV, ESR, Blood Indices.

Blood grouping – ABO & Rh typing

Determination of bleeding time & clotting time

Haemolysis & fragility tests (Demonstration only)

2. Nerve Muscle Physiology

All the laboratory exercises done by undergraduate students in nerve muscle

Physiology – Skeletal muscle, cardiac muscle & smooth muscle (Graph discussion)

Ergography

EMG & Nerve conduction studies (Demonstration only)

3. Nervous system & Special senses

Examination of higher functions

Examination of sensory system

Examination of motor system

Examination of cranial nerves

Examination of reflexes

Examination of nervous system in a patient with nervous system disorder & interpret the data obtained.

EEG (Demonstration only)

Perimetry

Tests for hearing & deafness interpretation

4. Cardiovascular system

Examination of cardiovascular system in a normal person.

Determination of arterial blood pressure & its variation with posture & exercise

Recording of arterial pulse using physiograph

Recording of normal ECG in 12 leads

Echocardiography & treadmill test (Demonstration only)

5. Respiratory system

Examination of respiratory system in a normal person.

Recording of respiratory movements – normal & after exercise, using stethograph & Spirometer & interpretation of data obtained.

Peak expiratory flow meter studies

6. Endocrinology & Reproduction (Chart discussion only)

Evaluation of a patient with endocrine disorder

Determination of ovulation time by basal body temperature chart, cervical smear & vaginal smear

Pregnancy diagnostic tests – Immunological test (Demonstration only)

COURSES

Course I General Physiology, Haematology, Cardiovascular System

(U19MDPY01)

CO1: Describe the structure of cell membrane with reference to ion channels. Homeostasis, Transport across cell membrane and Bioelectric potentials

CO2: Discuss the Body fluid compartments, Homeostasis, Plasma proteins, RBC, WBC, Platelets, Coagulation of Blood, Blood Group, Lymph and Tissue fluid.

CO3: Describe Functional anatomy of heart and blood vessels, Properties of Cardiac muscle, Cardiac cycle, Normal ECG, Cardiac output, Haemodynamics. Blood pressure, Regional circulation, Shock.

CO4: Should be able to perform common hematological tests and interpret the results

General Physiology

General and Cellular Basis of Human Physiology

Organisation of body fluids.

Functional morphology of cell

Transport across cell membrane & capillary wall

Intercellular communications

Genetics and Gene therapy

Homeostasis, Bio electric potentials

Haematology

Composition & functions of blood, functions of plasma proteins.

The functional basis of different formed elements of blood. Elaborate on the current concepts of hemopoiesis, abnormalities in the RBC function with the functional basis of anaemias, the abnormalities in WBC, the basis of the various types of immunological responses in the human body and the mechanisms of regulation of immune responses, abnormalities in platelet functions, haemostatic mechanisms in health and disease.

Current trends in the classification of various blood groups & physiological considerations in blood transfusion

Blood volume.

Fluid dynamics in blood vessels

Lymph & tissue fluid.

Cardiovascular System

Organisation of CVS, Origin and spread of cardiac impulse

Cardiac Cycle – Normal electrical and mechanical events & their abnormalities.

Cardiac output, Haemodynamics

Blood pressure and stroke volume

Blood pressure & its regulation.

Renal control of blood pressure

Regional circulation including lymphatic circulation, foetal circulation.

Shock, cardiopulmonary adjustments in health and disease.

Basic principles in the assessment of CVS function.

Course II Physiology of Respiration, Renal Physiology, Skin & Temperature

Regulation, Principles of Biophysics as applied to Physiology

(U19MDPY02)

CO1: Explain Mechanism of Breathing, surfactant. Ventilation, Pulmonary Circulation, Transport of gases, Regulation of respiration, Hypoxia, exercise, artificial respiration-
CO2: Should be able to perform common human physiology experiments and interpret the results
CO3: Should be able to draw amphibian skeletal and cardiac muscle graphs and discuss the physiological basis

Excretory System

Functional anatomy of kidney and the basic principles involved in the secretory and excretory function of kidney.

Evaluate the role of kidney in fluid and electrolyte homeostasis & acid - base balance.
The physiological basis of evaluation of renal functions in health and disease.

Principles of dialysis.

Physiological basis of diuretic action

Renal transplantation.

Skin & temperature regulation

Respiratory System

Functional Anatomy of Respiratory System

Respiratory movements & muscles involved in it. Bronchial tone.

Mechanics of Pulmonary Ventilation - Spirometry - Lung volumes & capacities.

Pressures during the breathing cycle, elastic properties of lung, compliance of lung & chest wall, alveolar surface tension, work of breathing, airway resistance.

Ventilation & Perfusion, Pulmonary Ventilation, Alveolar ventilation, Dead space, Pulmonary blood flow, Ventilation Perfusion Ratio.

Low V/Q ratio and its clinical importance

Composition of respiratory gases.

Respiratory Membrane, Physics of Diffusion.

Transport of Gases - Transport of Oxygen, Oxygen Dissociation curve and factors affecting it. Carbondioxide transport, CO₂ dissociation curve

Surface tension and surfactants

Myoglobin & foetal haemoglobin

Regulation of respiration

Respiratory adjustments in health & disease – Including high altitude Physiology & Acclimatisation

Pathophysiology of Bend

O₂ therapy, Use of Ventilators, artificial respiration.

Course III Nervous System, Special Senses, Muscle & Nerve Physiology (U19MDPY03)

CO1: Discuss the classification of muscles-Morphology of skeletal muscle, Mechanisms of muscle contraction

CO2: Explain the Morphology and properties of a neuron. Neuroglia, Action potential, Nerve injuries.

CO3: Discuss organisation of nervous system and functions. Synapse, Reflex action. Sensory system, Motor System, and higher functions of brain

CO4: Describe the physiology of vision, audition, smell and taste

Nerve Muscle Physiology

Major historical landmarks in the development of current concepts of nerve muscle physiology.

Nerve Cells- Structure, properties and function, Classification of fibre types

Bioelectric potentials, CRO

Nerve degeneration & regeneration

Mixed Nerve – properties

Synapse – properties and functions

Neuroglia

Skeletal muscle- Physiological anatomy of skeletal muscle, Molecular mechanism of muscle contraction, types of contraction, length tension relationship.

Electrical Phenomena & ionic fluxes, energy sources and metabolism

Properties of muscle in intact organism

Motor unit, effects of denervation, EMG and its applications.

Cardiac muscle – Functional anatomy, electrical properties, mechanical properties, length tension relationship. Conducting system of heart and its electrical properties
Smooth muscle – Morphology, Types, electrical & mechanical properties, control of smooth muscle contraction, length - tension relationship, plasticity.
Neuromuscular Physiology, diseases affecting neuromuscular junction.

Nervous System

Importance of evolution and development

The contributions of neurophysiologists who have led to the development of the present status of neurophysiology

Various methods used for the study of neurophysiology

Organisation of the nervous system

Sensory System Receptors, Pathways, thalamus, cortical Sensory areas.
Important abnormalities of pain & other somatic sensation.

Motor System Motor functions of spinal cord and spinal cord reflexes
Cortical and brainstem control of motor function
Cerebellum. Basal ganglia and overall motor control
Cerebral cortex, Motor & Sensory dysfunction at different levels.
Vestibular apparatus and equilibrium, posture & movement
Neurotransmitters

Autonomic Nervous System

Hypothalamus, Limbic System

Speech, Memory, Learning, Behaviour, Conditioned reflexes.

Sleep and electrical activities of brain

Cerebrospinal fluid

Special Senses

Olfaction, Gustation, Vision, Audition.

**Course IV Gastro Intestinal System, Endocrine System, Reproductive System,
Recent Advances in Physiology (U19MDPY04)**

CO1: Discuss the secretory and motor functions of gastrointestinal tract

CO2: Explain the role of kidney in formation of urine, regulation of pH and body fluid volume and also clinical implications

CO3: Describe the mechanism of action, functions and abnormalities in secretion of endocrine glands

CO4: Should be able to perform clinical examination of various systems

CO5: Describe the development of male and female characteristics, hormonal changes, menstrual cycle, fertilization, pregnancy and contraceptive methods.

Gastro Intestinal System

Nutrition & metabolism, energy balance

Functional anatomy of GIT

Secretions of GIT and associated glands and their regulation

Movements of GIT

Digestion and Absorption

Describe the basis of evaluation of metabolic functions in health and disease with special reference to liver function tests.

Gastro intestinal hormones, disorders of gastrointestinal function.

Endocrinology

Synthesis & secretion, transport, metabolism, mode of action and estimation of various hormones secreted by the endocrine glands.

The neurohumoral mechanisms involved in regulation of hormonal secretions and their mechanism of action at cellular level.

Changes that occur in body as a result of hypo and hyper function of different glands and their hormonal interactions correlating with the function tests.

Bone physiology and calcium metabolism

Endocrine functions of other organs.

Growth, development and ageing.

Reproductive System

Development and functions of gonads

Sex differentiation and their abnormalities

Male reproductive system

Female reproductive system

Puberty, Menopause

Pregnancy, Lactation, Contraception
Infertility & its management

Course V Soft Skills (U19MDPY05) - Elective

CO1 Awareness about different study designs, sample size calculation, different methods of hypothesis testing and clinical trials. Proficiency in conducting a research.

CO2 Proficiency in different aspects of medical ethics and etiquette. Awareness about the responsibilities of being a part of a team/department.

CO3 Proficiency in teaching and the use of various teaching aids.

CO4: Ability to work as the member of a team.

TEXTBOOKS RECOMMENDED

1. Prescribed Books -

1. Text Book of Medical Physiology: Arthur. C. Guyton- W.B. Saunders.
2. Review of Medical Physiology: W.B. Ganong. Lange Medical Book.
3. Understanding Medical Physiology: R.L. Bijalani- Jaypee Brothers
4. Text Book of Human Physiology: Madhavankutty, Sarada Subramaniam & H.D. Sing S. Chand and company.
5. Text book of Practical Physiology: Ghai
6. Text book of Practical Physiology: G.K.Pal

2. Reference Books –

1. Best and Taylor's Physiological Basis of Medical Practice: J.B. West (Ed) William & Walkins.
2. Physiology: Berne & Levy
- 3 Text book of Medical Physiology: Indu Khurana - Elsevier
4. Concise Medical Physiology: S.K. Chaudhuri – New Medical Book Agency, Calcutta.
5. Williams Text book of Endocrinology
6. Clinical Haematology: Wintrobe's
7. De Gruchy's Clinical Haematology in Medical Practice

8. Text Book of Biochemistry: Dr. D.M.Vasudevan & Dr.Sreekumari
9. Harper's Text Book of Biochemistry
10. Hutchinson's Clinical methods

RESEARCH

Each candidate has to work on a particular topic for thesis, submission of which shall be as per University regulations. The thesis should be brief, clear and focus on the relevance of the topic & should be under the following sub-headings

- 1.Title
- 2.Introduction
- 3.Review of literature
- 4.Materials & methods
- 5.Observations
- 6.Discussion
- 7.Summary & conclusion
- 8.Bibliography
- 9.Appendix – tools used for data collection like questionnaire etc

It should be submitted to the University at least 3 months before commencement of final University examination.

LOG BOOK & RECORD BOOK–

Candidate has to maintain a journal, duly certified by the teacher, in which all the practicals done by him/her are recorded

Candidate will also maintain work diary/log book & record his/her participation in all day to day training programs conducted by the department. Attendance in CME's, conferences, seminars & other academic programs are to be entered in this.

The journal & logbook must be scrutinized & certified by the Head of the department.

TEACHING OF UG STUDENTS –

During training period, the candidate should actively involve themselves in teaching programs for undergraduates, both theory & practicals

ADMINISTRATION –

They should be able to organise the laboratories for the conduction of various practicals.

Handle and order equipment for the stores, draw up lists of equipments required to equip any section of physiology.

TEACHING-LEARNING METHODOLOGY –

Group Discussions

Attending Lectures/Demonstration

Conducting / Attending seminars & Journal clubs

Conducting / Attending Practical demonstrations for UG students and Paramedicals

Practical exercises

Microteaching sessions

EXAMINATION PATTERN

Theory - 4 papers – 100 marks each Total - 400 marks

Topic distribution for theory -

Paper I - General Physiology, Haematology, Cardiovascular system

Paper II - Physiology of Respiration, Renal Physiology, Skin & temperature

Regulation, Principles of Biophysics as applied to Physiology

Paper III - Nervous system, Special senses, Muscle & nerve Physiology

Paper IV– Gastro intestinal Physiology, Endocrine system,

Reproductive system, Recent advances in Physiology

Question paper pattern -

Each paper - 3 Hours duration

Essay 2 x 20 = 40marks

Short Essays 5 X 10 = 50 marks

Short notes 2 X 5 = 10 marks

Total 100 marks

Practical exam –

Day 1	Marks
OSPE	50
Clinical Examination of subject provided	40
Hematology	50
Human Physiology	20
Graph Discussion (Amphibian & Mammalian)	20
Chart discussion (Clinical Cases, Interpretation of data, ,Charts etc)	20
Day 2	
Micro Teaching	20
Theory Viva	100

A candidate securing separate minimum of 50 % in theory and practical
Is eligible to pass the examination. Those securing 75% and above are eligible
for distinction.

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MD Physiology examination

Model Question Paper

Paper I

General Physiology, Haematology & Cardiovascular system

Max marks 100

Draw neatly labeled diagrams wherever necessary. Leave first page blank for mark distribution

- I. Describe the blood supply of heart. Give an account of the pathophysiology of ischaemic heart disease

(10+10=20marks)

- II. Discuss the indications for transfusion of blood and blood products. Explain the signs and symptoms of mismatched blood transfusion, giving their physiological basis.

(10+10=20marks)

- III. Discuss the following -

- A. Compensatory mechanisms during hypovolemic shock
- B. Clinical applications of bioelectric potentials
- C. Active transport across cell membrane & their inhibitors
- D. Role of lymphocytes in immune mechanism
- E. Regulation of heart rate

(10 marks X5=50 marks)

- IV. Write briefly on -

- A. Osmosis
- B. Functions of platelets

(5 marks X2=10 marks)

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MD Physiology examination

Model Question Paper

Paper II

Max marks 100

Draw neatly labeled diagrams wherever necessary. Leave first page blank for mark distribution

- I. Explain the mechanism of oxygen transport to tissues. Explain the various causes of hypoxia. What is oxygen toxicity ?

(10 + 6 + 4 =20 marks)

- II. Describe the mechanism and significance of renal H^+ ion secretion and buffer systems in renal tubular fluid.

(20 marks)

- III. Discuss the following -

A. Renal function tests & their clinical significance

B. Role of skin in body temperature regulation

C. Acclimatization to high altitude

D. La Place's law as applied to pulmonary and renal function

E. Ventilatory responses to PO_2 , PCO_2 & pH changes & their interrelationship

(10 marks X5=50 marks)

- IV. Write briefly on -

A. Physiological applications of Donnan's membrane equilibrium

B. Ventilation perfusion ratio & its significance

(5 marks X2=10 marks)

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**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program

MD Psychiatry

(Revised with effect from 2019-2020 onwards)

GOAL

The goal of the MD training programme is to provide the competencies so that after the training, the candidate is able to work as Senior Resident/ Assistant Professor in the specialty of Psychiatry

OBJECTIVES

to be achieved by an individual at the end of 3 years of MD training

Basic Sciences : The candidates should be thoroughly familiar with basic and applied neuroanatomy, neurophysiology, sociology, neurochemistry, developmental and social psychology, anthropology & ethology.

General & Clinical Psychology : The candidates are expected to have a sound knowledge of general psychological principles in areas such as personality, learning, intelligence, memory, emotions, perceptions etc. They are expected to learn the theory and practical aspects of clinical psychology like psychometric assessment and psychological methods of treatment.

Statistics and Research Methodology : The candidates should have basic skills in statistics and research methodology so as to successfully interpret/conduct research.

Clinical Psychiatry : The candidates should attain a high degree of clinical proficiency in history taking, conducting and reporting psychiatric examination, diagnosis and the treatment of the common psychiatric disorders.

Child and adolescent Psychiatry : The candidates should acquire a sound knowledge of principles and practice of child & adolescent psychiatry including learning disability, mental retardation and other emotional & behavioural disorders.

Psychopharmacology : Residents should be thoroughly familiar with basic principles of psychopharmacology and should have sound knowledge of all aspects of psychopharmacological practice.

Psychodynamics & Psychotherapies : Candidates should have a proper understanding of the various schools of psychodynamic thought and their applications to psychiatry. They should also become familiar with theoretical framework and techniques of Psychoeducation, individual as well as group psychotherapy, behaviour therapy and should be able to conduct such therapies.

Psychosomatic Disorders & Liaison psychiatry : The candidates should develop skills in understanding and managing psychosomatic disorders and liaison psychiatry. They should also be aware of the psychosocial aspects of various medical and surgical disorders.

Emergency Psychiatry : The candidate should become familiar with psychiatric emergencies and their management.

Programme Outcomes

PO1: The candidates should be thoroughly familiar with basic and applied neuroanatomy, neurophysiology, sociology, neurochemistry, developmental and social psychology, Psychometry and Genetics

PO2: General & Clinical Psychology : The candidates are expected to have a sound knowledge of general psychological principles in areas such as personality, learning, intelligence, memory, emotions, perceptions etc.They are expected to learn the theory and practical aspects of clinicalpsychology like psychometric assessment and psychological methods of treatment

PO 3: Clinical, child and adolescent Psychiatry : The candidates should attain a high degree of clinical proficiency in history taking, conducting and reporting psychiatric examination, diagnosis and the treatment of the common psychiatric disorders.Residents should acquire sound knowledge of principles and practice of child and adolescent psychiatry including learning disability,mental retardation and other emotional and behavioral disorders.

PO 4 : Psychopharmacology,Psychodynamics,Psychotherapies,Psychosomatic disorders,liaison psychiatry and emergency psychiatry : Residents should be thoroughly familiar with basic principles and should have sound knowledge of psychopharmacology and all aspects of psychopharmacological practice.They should also be familiar with theoretical framework and technique of psychoeducation,individual as well as group psychotherapy,behaviour therapy and should be able to conduct such therapies.They should understand and manage psychosomatic disorders and liaison psyciatry.Residents should also be aware of psychosocial aspects of medical and surgical disorders and psychiatry emergencies and their management.

PO 5: Psychodynamics & Psychotherapies : Candidates should have a proper understanding of the various schools of psychodynamic thing and their applications to psychiatry. The should also become familiar with theoretical framework and techniques of Psychoeducation, individual as well as group psychotherapy, behaviour therapy and should be able to conduct such therapies.

PO 6: Psychosomatic Disorders & Liaison psychiatry : The candidates should develop skills in understanding and managing psychosomatic disorders and liaison psychiatry. They should also be aware of the psychosocial aspects of various medical and surgical disorders.

PO 7: Emergency Psychiatry : The candidate should become familiar with psychiatric emergencies and their management.

PO 8: -Applying scientific thinking and evidence based approach

PO 9: Establishing a therapeutic Doctor-Patient relationship

Po 10: Identifying significant problem/need of patient

PO 11: Collecting relevant information including personality and psychologic issues that results in a diagnostic formulation

PO12: Formulating a comprehensive differential diagnoses including medical causes

PO 13: Appropriately documenting the decision making process and written justification for the professional judgment

Program Specific Outcomes

PSO 1: Able to apply scientific thinking and evidence based approach and to maintain critical and analytical perspective.

PSO 2 : Able to demonstrate cultural sensitivity in clinical situations and establish therapeutic patient-doctor relationship and identifying significant problem/need of patient

PSO 3: Able to collect relevant information including personality and psychologic issues that results in a diagnostic formulation and thereby to formulate comprehensive differential diagnoses including medical causes

PSO 4: To write a management plan taking into consideration safety and biophysical aspects and appropriately documenting decision making process and written justification for professional judgement.

PSO 5: To be able to communicate effectively with patients, relatives, colleagues and subordinates.

PO 6 :Statistics and Research Methodology : The candidates should have basic skills in statistics and research methodology so as to successfully interpret/conduct research.

SKILLS

- Applying scientific thinking and evidence based approach
- Maintaining a critical and analytical perspective
- Demonstrating cultural sensitivity in clinical situations
- Establishing a therapeutic Doctor-Patient relationship
- Identifying significant problem/need of patient
- Collecting relevant information including personality and psychologic issues that results in a diagnostic formulation
- Formulating a comprehensive differential diagnoses including medical causes
- Writing a management plan taking into consideration safety and biopsychosocial aspects
- Appropriately documenting the decision making process and written justification for the professional judgment
- Communicating effectively with patients, relatives, colleagues and subordinates

COURSE CONTENTS

THEORY SYLLABUS

Semester I.

Basic Sciences as applied to psychiatry, Neuroanatomy,

Neurochemistry, Neurophysiology

Neurotransmitters & Neuropeptides

Second Messenger Systems and Beyond

Basic and applied Electrophysiology

Neuroimaging and Implications for Psychiatry

Consciousness
Sleep and Dreaming
Chronobiology
Social & Transcultural Psychiatry
Ethology
Anthropology
Statistics & Research
Aggression: Psychology and Biology
Intelligence
Learning Theories
Personality, Emotions, Motivations
Information Processing: Brain Models of Mind
General psychology including abnormal psychology, social psychology and psychometry
Clinical and developmental psychology

Semester II

Clinical Psychiatry

- (a) Approach for diagnosis and classification of Psychiatric disorders.
- (b) Concept, Typology, etiology, clinical features, course, outcome & prognosis of organic mental disorders
 - Alcohol & Drug dependence
 - Schizophrenia & related psychiatric diseases
 - Mood disorders
 - Personality disorders
- (c) Experimental Diagnostic Research methodology and Implications for Mental disorders
 - Psychiatric History taking, Examinations, Psychopathology
 - Phenomenology
 - Communications and interviewing skill.

Semester III

Clinical Psychiatry Concepts, Typology, etiology, Clinical features, outcome prognosis of:

- Anxiety disorders: clinical psychiatry
- Stress induced disorders and somatoform disorders
- Non organic disorders
- Eating disorders
- Psychosexual disorders
- Habit and impulse disorders
- Psychiatry emergencies

Semester IV

Therapies

- (a) Psychopharmacology : General principles, classifications, indications, adverse effect
- (b) Psychotherapies : General principles, classifications, indications, adverse effect
- (c) Behaviour therapies : General principles, classifications, indications, adverse effect
- (d) ECT : General principles, classifications, indications, adverse effect

Semester V

Neuropsychiatry and Medicine as related to psychiatry

Dementia : Differential Diagnosis and Management
 Delirium : Differential Diagnosis and Management
 Psychiatric Syndromes with Epilepsy
 Neuro-psychiatric Sequel of HIV Infection
 Consultation-Liaison Psychiatry
 Psychological Aspects of Cardio-vascular Disorders
 Psychological Aspects of Gastro-intestinal Disorders
 Obesity
 Psychoendocrinology, Psychooncology, Psychodermatology,
 Psychoimmunology
 Concept and Assessment of Disability & Quality of Life
 Neuro-Psychologic Assessment and its Relevance to Psychiatric
 Diagnosis and Management
 Psychological Aspects of Organ Transplantation

Semester VI

Psychiatry specialities

- (a) Ethics and NDPSA, CPA, Indian Disability Act & other related laws Indian Mental Health Act
- (b) Geriatric psychiatry
Epidemiology and management of Geriatric Psychiatric disorders with special emphasis to India
- (c) Community psychiatry
General principles, NMHP and other community based programmes
- (d) Forensic Psychiatry
- (e) Child and adolescent psychiatry
Epidemiology, classifications, etiology, clinical features, progression, course and management

THESIS

Rules for submission of Thesis / Dissertation

Every candidate pursuing P.G degree course is required to carry out work on a selected research project under the guidance of recognized post Graduate teacher. The results of such work should be submitted in the form of a dissertation.

Dissertation is aimed to train the post graduate student in methods and

Technique of research methodology. It includes identification of a problem formulation of hypothesis, search and review of literature, acquaintanace with recent advances, designing of a research study collection of data, critical analysis, comparison of results and drawing conclusion.

Every candidate shall submit to The Principal in the prescribed proforma, a synopsis containing particulars of proposed dissertation work with in three months from the date of commencement of the course. The synopsis should be sent through proper channel.

Such synopsis will be reviewed and cleared by the Ethics Committee and the registered by the University. No change in the dissertation topic or guide can be made without prior approval of the university.

The dissertation should be written under the following headings

- 1.Introduction
- 2.Aims or objectives of the study
- 3.Review of literature
- 4.Materials and Methods
- 5.Results, Tables and observations
- 6.Discussion
- 7.Coclusion
8. References
- 9.Annexures

Dissertation shall be

1.Typed in double line spacing in single side of A4 size paper
(8.27inches (width) x 11.69 inches (length))

2. Shall not be less than 50 pages and should not exceed 150 pages excluding References , tables and Annexure.

3.Spiral binding should not be done.

Four copies of the dissertation along with a soft copy on a CD shall be submitted to the Principal for evaluation three months before Final Examination.

The Examiners appointed by the University shall value the dissertation. Approval of dissertation work is essential pre- condition for a candidate to pass the University Examination.

GUIDE: The academic qualification and teaching experience require for recognition by this University as a Guide for dissertation work is as per Medical Council of India Minimum Qualification for Teachers in Medical Institutions Regulations 1998. Teachers in a Medical college having a total of eight years teaching experience as Lecturer or Assistant professor gained after obtaining Post Graduate Degree shall be recognized as post graduate Teachers.

A Co- Guide may be included provided the work requires substantial contribution from a sister department. The co-guide shall be a recognized postgraduate teacher.

CHANGE OF GUIDE: In the event of a registered guide leaving the Institution for any reason, the Guide may be changed with prior permission from the university.

Guidelines for writing Thesis / Dissertation

The thesis may be normally restricted to the size to 150 pages. To achieve this, following points may be kept in view;

- (i) Only contemporary and relevant literature may be reviewed.
- (ii) The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference may be given.
- (iii) Illustrative material may be restricted.
- (iv) Since most of the difficulties faced by the residents relate to the work in clinical subject or clinically oriented laboratory subjects the following steps are suggested:

For prospective study, as far as possible, the number of cases should be such that adequate material, judged from the hospital attendance, will be available and the candidate will be able to collect the case material within a period of 6-12 months so that he/she is in a position to complete the work within the stipulated time.

The objectives of the study should be well defined.

As far as possible, only clinical or laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.

Technical assistance, wherever necessary, may be provided by the department concerned. The resident of one speciality taking up some problem related to some other speciality should have some basic knowledge about the subject and he/she should be able to perform the investigations independently, wherever some specialised laboratory investigations are required a co-guide may be coopted from the concerned investigative department, the quantum of laboratory work to be carried out by the candidate should be decided by the guide and coguide by mutual consultation.

The Clinical residents may not ordinarily be expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected or the use of chemicals or radio isotopes not readily available. They should however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies should be feasible within the existing facilities.

The residents should be able to use freely the surgical pathology/autopsy data if it is restricted to diagnosis only, if however, detailed historic data are required the resident will have to study the cases himself with the help of the guide/co-guide.

The same will apply in case of clinical data.

METHODS OF TRAINING

a. Year-wise structure of Training Programme

Each trainee will be given clinical responsibility of various areas in rotation.

The general schedule of clinical posting should bear follows:

Ward/OPD/Emergency- 18months

Neurology- 03 month

Internal Medicine- 03month

Clinical Psychology- 03 month

Drug De-addiction- 03 months

Child & Adolescent Psychiatry/Forensic Psychiatry- 04 months

Community Psychiatry- 02 months

The DPM candidates would be given full responsibility for the patient care and the record keeping under the supervision of the Senior Resident and Consultants

b. Rotation and Posting in other departments

Neurology 03 month

Internal Medicine 03 month

Clinical Psychology 03 month

Community Psychiatry 02 month

c. Teaching and Learning activities like Seminar, Symposium etc.

1. Seminars: There should be weekly seminar in which the DPM candidates should present material on assigned topics in rotation. It should be followed by discussion in which all trainees are supposed to participate. Generally the topics covered should be those that supplement the formal teaching programme.
2. Case Conference: A case conference should be held every week where a trainee prepares and presents a case of academic interest by rotation and it is attended by all the members of the Department.
3. Journal Club : There should be atleast once in a month Journal Club in which the critical evaluation of a research paper from a journal.
4. Psychosomatic Rounds. This is a presentation of a case of psychosomatic illness, or a medical illness with pronounced psychiatric problems. It should be held weekly in collaboration with various departments and attended by the faculty and the trainees and the staff from the concerned department.
5. Case presentation: All new in-patients and outpatients cases should be routinely reviewed with one of the Consultants. In addition, the candidate is required to present case material at routine rounds and other case conferences.
6. Psychotherapy tutorials: These should be held in small groups supervised by a consultant in which a case is presented by a trainee and psychotherapeutic management discussed.
7. Attendance at special clinics/unit as applicable e.g. Child and Adolescent Psychiatry Clinic, Marital and Psychosexual Clinic, Community Outreach Clinics, Drug-de-addiction unit etc.
8. Training in ECT administration.

9. Extra-mural activities : The candidates should be encouraged to attend certain academic/semi-academic activities in the allied subjects outside, e.g. seminars/lectures held at Departments of Sociology, Psychology, Neurology etc.

SCHEME OF EXAMINATION

Theory

(i) No. of Papers- 4

(ii) Maximum Marks- 400

Each theory paper will comprise of TWO ESSAYS 20 MARKS EACH & 10 SHORT NOTES 6 MARKS EACH. Maximum marks for each paper will be 100.

Paper I: Neuro anatomy and Neurophysiology (including Genetics & Biochemistry) Psychosocial Basis of Human Behaviour (including General Psychology, abnormal Psychology, Social Psychology, Psychometry and Biostatistics) (U19PSY01)

CO1: Knowledge of Neurotransmitters, neuropeptides, basic and applied electrophysiology, neuroimaging and implications in psychiatry

CO2: Social and transcultural psychiatry, ethology and anthropology

CO3: In depth knowledge of intelligence, learning theories, personality, emotions and Brain models of Mind

CO4: Knowledge of general psychology, Abnormal psychology, Social psychology and Psychometry

Basic Sciences as applied to psychiatry, Neuroanatomy,

Neurochemistry, Neurophysiology

Neurotransmitters & Neuropeptides

Second Messenger Systems and Beyond

Basic and applied Electrophysiology

Neuroimaging and Implications for Psychiatry

Consciousness

Sleep and Dreaming

Chronobiology

Social & Transcultural Psychiatry

Ethology

Anthropology

Statistics & Research

Aggression: Psychology and Biology

Intelligence

Learning Theories

Personality, Emotions, Motivations

Information Processing: Brain Models of Mind

General psychology including abnormal psychology, social psychology and psychometry

Clinical and developmental psychology

Paper II: Clinical Psychiatry including recent advances (U19PSY02)

CO1: Approach for diagnosis and classification of Psychiatric disorders

CO2: Concept,typology,etiology,clinical features,course,outcome and prognosis of organic mental disorders

CO3: Experimental Diagnostic Research methodology and implications for mental disorders

CO4: Communications and interviewing skill

Clinical Psychiatry

(a) Approach for diagnosis and classification of Psychiatric disorders.

(b) Concept, Typology, etiology, clinical features, course, outcome & prognosis of organic mental disorders

Alcohol & Drug dependence

Drug abuse

Schizophrenia & related psychiatric diseases

Mood disorders and its long term prognosis with regard to the quality of life

Personality disorders

(c)Experimental Diagnostic Research methodology and Implications for Mental disorders

Role of neuroimaging in clinical psychiatry

Psychiatric History taking, Examinations, Psychopathology

Phenomenology

Communications and interviewing skill.

Paper III: Psychiatric Specialties (U19PSY03)

CO1: Ethics and NDPSA,CPA,Indian Disability Act and other related laws Indian Mental Health Act

CO2: Geriatric psychiatry

CO3: Community psychiatry

CO4: Child and adolescent psychiatry

Psychiatry specialties

(a) Ethics and NDPSA, CPA, Indian Disability Act & other related laws Indian Mental Health Act

(b) Geriatric psychiatry

Epidemiology and management of Geriatric Psychiatric disorders with special emphasis to India

(c) Community psychiatry

General principles, NMHP and other community based programmes

(d) Forensic Psychiatry

(e) Child and adolescent psychiatry

Epidemiology, classifications, etiology, clinical features, progression, course and management

Paper IV: Neurology & general medicine related to psychiatry (U19PSY04)

CO1: Dementia ,delirium,epilepsy,neuro psychiatric sequel of HIV infection

CO2: Psychoimmunology - assessment of disability and quality of life,neuro-psychologic assessment and its relevance to psychiatric diagnosis and management.

CO3: Diagnosis and management - psychological aspects of Organ transplantation

Neuropsychiatry and Medicine as related to psychiatry

Dementia : Differential Diagnosis and Management
 Delirium : Differential Diagnosis and Management
 Post partum psychosis and post partum depression
Psychiatric Syndromes with Epilepsy
 Neuro-psychiatric Sequel of HIV Infection
 Neuro-psychiatric Sequel of autoimmune disorders
 Consultation-Liaison Psychiatry
 Psychological Aspects of Cardio-vascular Disorders
 Psychological Aspects of Gastro-intestinal Disorders
 Obesity
 Eating disorders
Psychoendocrinology, Psychooncology, Psychodermatology,
 Psychoimmunology
 Concept and Assessment of Disability & Quality of Life
Neuro-Psychologic Assessment and its Relevance to Psychiatric
 Diagnosis and Management
Psychological Aspects of Organ Transplantation

Soft Skills – Elective Course

- CO1: Competency to conduct a clinical research and knowledge about statistical methods.
- CO2: Competency to work as a team leader.
- CO3: Knowledge of medical ethics and etiquette.
- CO4: Ability to interact with the patients and their relatives in an effective manner.
- CO5: Attitude to be a lifelong learner.
- CO6: Ability to be an effective teacher/communicator.

Practical examination-

Long case, Short cases, Spots, Ward round, Viva voce,
 OSCE(5 minutes each station of clinical cases -regarding history, clinical findings and
 management, photographs of cases, Radiological investigations, instruments etc.)

Total Marks

Maximum marks	Theory	Practical	Viva	Grand Total
	400	200	100	700

MODEL QUESTION PAPERS

Paper I – BASIC SCIENCES AS RELATED TO PSYCHIATRY (NEURO-ANATOMY, NEUROPHYSIOLOGY, NEUROCHEMISTRY, BIOSTATISTICS, GENERAL PSYCHOLOGY, ABNORMAL PSYCHOLOGY, SOCIAL PSYCHOLOGY, PSYCHOMETRY AND GENETICS)

Time : Three hours Maximum : 100 marks
Draw suitable diagram wherever necessary.
Answer ALL questions.

I. Essay questions : (2 X 20 = 40)

1. Describe the Neurophysiology of sleep.
2. Discuss the role of GABA in CNS neurotransmission and its relevance for psychiatric disorder.

II. Write short notes on : (10 X 6 = 60)

1. Nonparametric statistics.
2. Systematic desensitization.
3. Corpus Callosum.
4. p300 Event related potential.
5. Contributions of Dr. A. Venkoba Rao.
6. Functional Magnetic Resonance Imaging.
7. Rorschach and its relevance.
8. Genetic counseling in Psychiatry.
9. Cognitive Behaviour Therapy in Depression.
10. Excitatory Neurotransmitters.

Paper II – CLINICAL PSYCHIATRY INCLUDING RECENT ADVANCES

Time : Three hours Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions :

(2 X 20 = 40)

1. Discuss the course and treatment of depression (including treatment resistant depression).
2. Describe the classification of male sexual dysfunctions. Discuss the approach to their evaluation and management

II. Write short notes on :

(10 X 6 = 60)

1. Cognitive Remediation in Schizophrenia.
2. Group therapy in Alcohol dependence.
3. Determinants of outcomes of severe mental disorders (DOSMED) study.
4. Psychiatric management of pain.
5. Transcranial magnetic stimulation therapy and its principle.
6. Therapeutic drug monitoring in Psychiatry.
7. Anesthetic modification in ECT.
8. Cognitive behaviour therapy for delusions
9. Behavioural therapy to obsessive compulsive disorder.
10. Soft neurological signs in schizophrenia.

Paper III – PSYCHIATRY SPECIALITIES

Time : Three hours Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

Essay Questions :

(2 X 20 = 40)

1. Discuss the clinical features and management of Attention Deficit Hyperactivity Disorder (ADHD)
2. Management of psychosis in the elderly

II. Write short notes on: (10 X 6 = 60)

- b. Binet Kamat Test
- c. Early onset schizophrenia
- d. Inhalant use in adolescents
- e. Behaviour therapy in the management of Conduct disorder
- f. McNaughten's rule
- g. Testamentary capacity
- h. IPC section 377 and psychiatry
- i. Memantine
- j. Admission procedures in Mental Health Act, 1987
- k. District mental health programme

Paper IV- GENERAL MEDICINE AND NEUROLOGY RELATED TO PSYCHIATRY

Time : Three hours Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions :

(2 X 20 = 40)

1. Discuss neuropsychiatric complications of thyroid disorders.
2. Discuss the clinical approach to young onset dementia.

II. Write short notes on :

(10 X 6 = 60)

1. Metabolic syndrome with antipsychotics.
2. Neuroendocrinology of depression.
3. Genetic counseling in fragile-x syndrome.
4. Post-concussion syndrome.
5. Newer antiepileptic drugs.
6. AIDS dementia.
7. Prophylaxis of Migraine.
8. Psychosocial support to terminally ill.
9. Psychiatric presentations in Parkinson disease.
10. Monitoring seizure in ECT.

FORMAT FOR LOG BOOK

It is essential that the trainee maintains a detailed account of the work done by him. The record book will in addition remind the trainee of what he should observe, learn and perform in a programmed and phased manner during the course of training. It is hoped that this record will stimulate the trainee towards greater effort in areas where he is below par and also record his progress. It forms the basis for assessment and evaluation of the trainees progress. Some of the possible criteria on the basis of which a trainee could be evaluated are - soundness of knowledge, application & judgment, keenness to learn, punctuality and promptness, initiative, reliability, clinical skill, behavior with patients, attitudes towards patient's relatives, colleagues, seniors and other staff, ability to express etc.

Depending on the qualities and the level of attainments a candidates could be considered for appraisal, on the basis, for example, of the following 5 letter grading system.

A Excellent Above 75%, B Good 60% - 65%, C Satisfactory 50%- 60%, D Poor 30% - 50%, E Bad Below 30%

Besides the grading as indicated above, each student would also be given a formal feed back on his/her weak points and how to overcome his/her deficiencies.

RECOMMENDED BOOKS

Must Read

Kaplan HI, Saddock BJ, Comprehensive text book of Psychiatry, Williams & Williams, Baltimore, USA.

□Kaplan and Saddock, Synopsis of psychiatry

Fish's Clinical Psychopathology

Sims A, Symptoms in the Mind, Saunders, Philadelphia, Pennysylvania

□Atkinson and Hilgard, Introduction to psychology.

Kuppuswamy, Social Psychology

Morgan and King, Introduction to Psychology □ □

Must Refer

Gelder M, Gath D, Mayou R, Oxford Textbook of Psychiatry, Oxford University press, Oxford, UK.

Hales RE, Yudofsky SC, American Textbook of Neuro-psychiatric, American Psychiatry press, Washington, USA.

American Psychiatric Association, Practice guidelines for the treatment of psychiatric disorders, APA, Washington, USA.

Talbott JA, Hales RE, Yudofsky, Textbook of Psychiatry, American Psychiatric Press, Washington, USA.

Hamiltan M, Fish.s Clinical Psychiatry, John Wright, Bristol.

Sims A, Symptoms in mind, Saunders, Philadelphia, Pennsylvania.

Lishman WA, Organic Psychiatry-the Psychological consequences of cerebral

disorders, Blackwell, Oxford, UK.

Tasman A, Kay J, Liebermann JA, Psychiatry, Panther Publications Pvt. Ltd. Bangalore, India.

American Psychiatric Association, Diagnostic and statistical manual of mental disorders, APA, Washington, USA.

Indian Psychiatric society, Guidelines for treatment of Psychiatric disorders, Indian Psychiatric Society, India.

LIST OF JOURNALS

Indian Journal of psychiatry

American Journal of Psychiatry

British journal of psychiatry

Archives of general Psychiatry

Journal of clinical Psychiatry

Acta Psychiatrica Scandinavica

Biological Psychiatry

Journal of Psychiatry and Clinical Neuroscience

Psychiatric Clinics of North America



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

PROGRAM

MD RADIODIAGNOSIS

(Revised with effect from 2019-2020 onwards)

OBJECTIVES:

Knowledge:

The candidate qualifying for the award of MD in Radio diagnosis and imaging should have a clear understanding of the following:

1. The process of x-rays and gamma ray production, their characteristics and interaction with matter.
2. The physical principles of signal detection, radiological image formation and the factors governing image quality.
3. The biological effects of radiation and the principle and practice of radiation protection, including the relevant regulations and recommendations of the AERB.
4. The fundamental principles of Radio nuclear pharmaceuticals, imaging techniques and interpretation of abnormal nuclear scans.
5. The gross and multiplanar anatomy of CNS, CVS, respiratory, GIT, urogenital & Musculoskeletal system and other organs.
6. Correlation of gross pathology of disease with imaging features.
7. Indications, diagnostic features and limitation of plain radiography, contrast radiography, fluoroscopy, ultrasonography, CT, MRI and catheter angiography in the imaging of various organ systems.
8. Overall diagnostic strategies (including non radiological tests) and management options in major clinical syndromes.
9. Current developments and future trends in imaging technology and practice.

Clinical Skills:

The candidate at the end of training should be able to do the following:

1. Independently perform and interpret routine radiography and ultrasound/doppler studies.
2. Independently perform and interpret radiological special investigations pertaining to the GI tract, urogenital tract, sinograms, fistulograms etc
3. Independently interpret routine spiral CT ,MDCT and MRI studies.

4. Perform conventional catheter aortograms, visceral and cerebral angiograms under supervision. Assist simple angioplasty and embolisation procedures.
5. Perform simple guided interventions like biopsies, aspirations and catheter drainage of abscesses.
6. Independantly interpret relevant imaging in acute emergencies and trauma and understand the medico legal aspects.
7. Derive a cost effective algorithm of various imaging techniques in a given problem setting.
8. Develop the capacity and motivation for continued self-learning.
9. Use the PACS effectively to enhance workflow efficiency.

Teaching and Research:

1. Teach the undergraduates and postgraduates in the specialty and to train related medical, paramedical and technical personnel.
2. Identify problems for research in the specialty particularly relevant to the disease pattern of the country and plan rational approach to achieve its goal.

PROGRAM OUTCOMES

PO1 To train physicians in the specialty of diagnostic radiology and make them capable of providing safe, appropriate and effective imaging services to the nation and community.

PO2 Provide a graduated, supervised clinical experience in interpreting and performing all studies that are encompassed by the specialty of diagnostic radiology.

PO3 Provide a committed faculty dedicated to educating and stimulating young physicians to achieve excellence in their clinical practices.

PO4 Provide the opportunity to participate in teaching and research in all aspects of radiology.

PO5 Provide an integrated approach to patient care by working closely with other specialties and professional health care providers.

PO6 Provide exposure to the expanded realm of medical practice to encompass such areas as medical ethics, medical law, total quality management, quality assurance, and professionalism.

PO7 Patient Care :- Residents must be able to provide patient care that is compassionate, appropriate and effective for the diagnosis and treatment of disease and the promotion of health.

PO8 Medical Knowledge :- Residents must demonstrate knowledge of established sciences as well as the application of this knowledge to patient care.

PO9 Practice Based Learning and Improvement : - Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence and to continuously improve patient care based on constant self-evaluation and lifelong learning.

PO10 Professionalism : -Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.

PO11 Interpersonal and Communication : - SkillsResidents must demonstrate interpersonal and communication skills that result in the effective exchange of information. Residents must team up with patients, their families and professional associates in order to provide excellent patient care.

PO12 Systems Based Practice : -Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

PROGRAM SPECIFIC OUTCOMES

Patient Care :- (PO7)

PSO1 Be an able consultant to clinicians. To be able to suggest appropriate diagnoses, follow-up or diagnostic work-up.

PSO2 Provide good patient care by making sure that the proper exams are ordered by clinicians in order to answer a clinical question.

PSO3 Advise pregnant patients regarding risks of radiation and obtain informed consent from the patient prior to performing any study with ionizing radiation. Advise patient or referring clinician of alternative imaging studies.

PSO4 Integrate all learning opportunities, conferences and learning materials available to the residents in order to optimize knowledge and ultimately patient care.

PSO5 Screen patients who are at risk for contrast reaction.

PSO6 Provide emergency treatment for adverse reactions to IV contrast.

PSO7 Produce independent, concise, accurate, timely reports for basic radiological investigations. Prepare reports of advanced imaging like MDCT and MR with supervision.

PSO8 Utilize PACS and available information sources to manage patient information.

Medical Knowledge (PO8)

PSO9 Gain a basic fund of knowledge which is to serve residents as their base for continued educational growth.

PSO10 Describe the common pathologic conditions, their typical imaging characteristics, and be aware of uncommon pathologic conditions.

Practice Based Learning and Improvement (PO9)

- PSO11 Demonstrate independent self-study using various resources.
- PSO12 Make use of all the learning opportunities and materials available in order to optimize knowledge and ultimately patient care.
- PSO13 Incorporate formative feedback into daily practice, positively responding to constructive criticism and learning from one's own errors.
- PSO14 Follow-up interesting or difficult cases without prompting, share this information with appropriate faculty and fellow residents.
- PSO15 Recognize limitations in personal knowledge and skills, being careful not to make decisions beyond the level of personal competence.
- PSO16 Determine where to look for information that goes beyond resident's own knowledge. In other words, teach residents to be life-long learners.

Professionalism (PO10)

- PSO17 Respect patient privacy and autonomy.
- PSO18 Show concern for the patient and the service in a way that supersedes self-interest.
- PSO19 Commitment to the ethical, compassionate care of patients.
- PSO20 Demonstrate good work ethic, including arriving promptly each day, completing the work in a timely fashion and not leaving at the end of the day until all work is complete.
- PSO21 Display sensitivity to a diverse patient population, including, but not limited to, ethnic diversity, gender, age, culture, race, religion, sexual orientation and disabilities. This includes patients, their families, and other members of the health care team.

Interpersonal and Communication Skills (PO11)

- PSO22 Know the importance of accurate, timely and professional communication in the overall context of health care, patient rights and medicolegal requirements.
- PSO23 Participate in relevant teaching activities with colleagues and technologists.
- PSO24 Communicate effectively with the referring physician about any recommendations for change in the type of exam to be performed, any significant or unexpected findings and document these communications.
- PSO25 Coordinate activities in the place of work, including, providing direction for the technologist, and consultation with clinicians.

Systems Based Practice (PO12)

- PSO26 Understand how image interpretation affects patient care and practice cost effective use of time and support personnel

PSO27 Educate healthcare consumers as well as other healthcare professionals on the most appropriate utilization of imaging resources. Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.

PSO28 Guide clinicians to a cost effective approach to patient workup for any given entity, and the appropriate utilization of resources available.

DURATION OF COURSE (3 YEARS).

TRAINING SCHEDULE

1 st Year APPLIED PHYSICS &BASIC SCIENCES	2 nd year	3 rd year
I – Conventional Chest Radiology II - Musculoskeletal Radiology III– Conventional and special GIT IV– Conventional and special GU V – 2D Ultrasound VI– Doppler Sonography	I – CT II - Vascular Radiology III –Neuroradiology IV – Emergency Radiology V– Nuclear Medicine VI– Pediatric Radiology	I – Neuro Surgery / Neurology II- Surgical Gastro / Gastroenterology III- Elective in Radiology IV- MDCT V – MRI VI - Interventional Radiology
- During each unit posting, candidate should be able to perform the procedures and interpret the findings. - Formal assessment at the completion of posting in each unit.		

SUBJECT CONTENT

Physics:

1. Introduction to general properties of radiation and matter. Fundamentals of nuclear physics and radioactivity.
2. Production of x-rays.
3. X-ray generating apparatus, fluoroscopy.
4. Interactions of x-rays and gamma rays with matter and their effects on irradiated materials.
5. Measurement of X and gamma rays.
6. Interaction of X-rays with the patients.

7. The Radiological image.
8. The Image Receptor including CR and DR systems.
9. Radiation protection.
10. Quality assurance.
11. PACS.
12. Principles of conventional, spiral and MDCT.
13. Principles of Diagnostic Ultrasound and doppler.
14. Nuclear Magnetic Resonance and imaging.
15. Radionuclide imaging (Gamma camera, spect, PET).

Theoretical Knowledge:

The clinical features, imaging anatomy, imaging findings and management strategies of relevant diseases in the organ systems:

1. Bones and joints
2. Respiratory system
3. Cardiovascular system
4. Gastro intestinal tract
5. Urogenital tract
6. Head & Neck including orbits.
7. Imaging Obstetric and Gynecology
8. Teeth, soft tissue and breast
9. Endocrine system
10. Clinical (applied) radionuclide imaging.
11. Interventional radiology related to different systems of body.
12. Contrast agents: Contrast media, their types, formulation, mechanisms of action, dosage, routes of administration, adverse reactions and their management and recent developments.

Practical Experience:

1. Radiography of the chest.
2. Radiography of the spine, extremities, abdomen, pelvic girdle and thorax.
3. Radiography of the skull.
4. Contrast techniques of GI tract, Biliary tract, GU tract.
5. Portable radiography, emergency and pediatric radiography.
6. Dark room technique.
7. Positioning, performing and interpreting a CT study.
8. Positioning, performing and interpreting an MR study.
9. Performing a diagnostic angiogram and its pre and post procedure care.
10. Performing USG / CT guided aspirations and catheter drainage.

11. Performing and interpreting USG and Doppler studies.
12. Develop a systematic, lucid and clinically oriented reporting style.
13. Develop skills for workstation based reporting.
14. Develop ability to use Hospital information system to maximize diagnostic accuracy and reporting speed.
15. Develop specialised computer skills for creating high quality presentations.

Guidelines for Teaching and Learning Activities:

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/ laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

1. **Lectures** : lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

- a. didactic lectures:

- 1) Bio-statistics.
- 2) Use of library.
- 3) Research Methods.
- 4) Medical Code of Conduct and Medical Ethics.
- 5) National health and Disease Control Programs.
- 6) Communication Skills etc.
- 7) Initial introductory lectures about the subject.

b. Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, e.g. Jaundice, Diabetes Mellitus, Thyroid etc.

2. **Journal Club** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in logbook relevant details. Further every candidate must make a presentation from the allotted journal(s) of selected articles at least four times a year and a total of 12 presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (evaluation sheet 1). A timetable with names of students and moderator should be announced at the beginning of every year.
3. **Subject seminar** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the logbook relevant details. Further every candidate must present selected topics at least four times a year and a total of 12 seminar presentations in three years. The presentations should be evaluated using checklists and would carry weightage for internal assessment (evaluation sheet 1). A timetable with names of students and moderator should be announced at the beginning of every year.
4. **Student Symposium** : Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.
5. **Inter Departmental Meetings** : Strongly recommended particularly with departments of Surgery, Orthopedics and Medicine at least once a month. These meetings should be attended by postgraduate students and relevant entries must be made in the Logbook.
6. **Teaching Skills** : Postgraduate students must teach Undergraduate students (e.g. Medical, Nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by faculty. Record of their participation should be kept in Logbook. Training of postgraduate students in Educational Technology is recommended.
7. **Department internal audit meetings**: Once a month internal meetings to audit patient care, reporting and other operational issues.

8. **Continuing Medical Education Programmes (CME)** : At least 2 state / national level CME programmes should be attended by each student in 3 years.
9. **Conferences** : Attending conferences is optional. However participation & presentation of scientific paper should be encouraged.

Courses:

Paper 1 (Basic Sciences, Radiological anatomy, Contrast Media, Imaging technology and Physics of radiation relevant to medical imaging) – Course 1 (U19MDRD01)

- CO 1 Detailed knowledge of Human anatomy and imaging (radiological) anatomy and the principles of radiographic positioning.
- CO 2 Knowledge of the physics of ionising radiation, the principles of its use for imaging, risk of radiation, safety measures for personnel and patient protection and regulations controlling its use.
- CO 3 Knowledge of the Physical principles of ultrasound, CT, PET and MRI, biosafety, and basic concepts of digital imaging and image quality.
- CO 4 Knowledge of the chemistry, pharmacokinetics, pharmacodynamics, dosage and toxicity of Imaging contrast media. Knowledge of contrast media reactions, their prevention and emergent management.

Introduction to general properties of radiation and matter. Fundamentals of nuclear physics and radioactivity.

Production of x-rays.

X-ray generating apparatus, fluoroscopy.

Interactions of x-rays and gamma rays with matter and their effects on irradiated materials.

Measurement of X and gamma rays.

Interaction of X-rays with the patients.

The Radiological image.

The Image Receptor including CR and DR systems.

Radiation protection.

Quality assurance.

PACS.

Principles of conventional, spiral and MDCT.

Principles of Diagnostic Ultrasound and doppler.

Nuclear Magnetic Resonance and imaging.

Radionuclide imaging (Gamma camera, spect, PET).

Paper 2 (Radiology of CVS, Respiratory, GIT (including Hepatobiliary and Endocrine systems)) – Course 2 (U19MDRD02)

- CO 1 Knowledge of Cardiovascular system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, Conventional angiography, CT ,MRI and PET.
- CO 2 Knowledge of Respiratory system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.
- CO 3 Knowledge of GI and hepatobiliary system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.
- CO 4 Knowledge of Endocrine system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.

**The gross and multiplanar anatomy of CNS, CVS, respiratory, GIT
Correlation of gross pathology of disease with imaging features.**

Indications, diagnostic features and limitation of plain radiography, contrast radiography, fluoroscopy, ultrasonography, CT, MRI and catheter angiography in the imaging of various organ systems.

Cardiac CT and its application

Radioimaging in pregnancy

Minimalising the radiation exposure among health care professionals

Overall diagnostic strategies (including non radiological tests) and management options in major clinical syndromes.

Paper 3 (Radiology of Genitourinary system, Obst. & Gynae, Musculoskeletal system, Central Nervous system and Head and Neck region)) – Course 3 (U19MDRD03)

- CO 1 Knowledge of Genitourinary system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.
- CO 2 Knowledge of Obst & Gynae pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.
- CO 3 Knowledge of Musculoskeletal system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, CT and MRI and PET.

CO 4 Knowledge of Central Nervous system pathology, pathophysiology and the imaging approach and features of these diseases on X-rays, Ultrasound, conventional angiography, CT and MRI and PET.

CO 5 Knowledge of Head and Neck region pathology, pathophysiology and the imaging approach and features of diseases on X-rays, Ultrasound, CT and MRI and PET.

The gross and multiplanar anatomy of Genitourinary System, Obs and Gynae, Musculoskeletal system , CNS and head and neck region

Correlation of gross pathology of disease with imaging

Indications, diagnostic features and limitation of plain radiography, contrast radiography, fluoroscopy, USG, CT, MRI and catheter angiography in the imaging of various organ systems.

Overall diagnostic strategies (including non radiological tests) and management options

Paper 4 (Recent advances in the imaging sciences, molecular imaging and Interventional radiology) – Course 4 (U19MDRD04)

CO 1 Knowledge of pharmacology of radionucleotides, indications for their use, radiation safety, and the imaging features in various clinical conditions.

CO 2 Knowledge of recent advances and trends in imaging sciences and related fields, their potential clinical value and limitations.

CO 3 Knowledge of the common Interventional radiology procedures (Indications, techniques, materials, patient selection, intra and post procedure patient care, complications and their management)

Knowledge about Current developments and future trends in imaging technology and practice in the international setting as well the use of pharmacological techniques in RadioDiagnosis

Radionucleotide pharmacology

Limitations in radiology

Recent advances in interventional radiology

Non interpretative knowledge and skills – Course 5 (U19MDRD05) – Elective Course

CO 1 Knowledge of guidelines, regulations and statutory requirements for imaging of pregnant women and safe radiation practice.

CO 2 Knowledge of ethical and medico-legal issues related to radiology practice, the critical importance of documentation and the skill to share information and communicate empathetically with patients.

Knowledge and skill to obtain an informed consent which is legally and ethically valid.

- CO 3 Interpersonal skills to to be an effective team member both in radiology and multi-speciality groups. The skills to communicate findings to referring physicians promptly and accurately, both orally and in written form and contribute usefully in discussions of complex clinical problems.
- CO 4 Knowledge of appropriate and rational use of imaging modalities in situations where resources are limited.
- CO 5 Knowledge of bio statistics to critically evaluate studies in the radiology literature and apply the knowledge to clinical practice. Be able to ask a research question, plan and conduct a statistically and ethically sound study and be able to write a good research paper.

Guidelines for Monitoring Learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps the teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching learning activities. It may be structured and assessment be done using checklists that assesses various aspects.

The learning out comes to be assessed should include: (a) Personal Attitudes (b) Acquisition of Knowledge, (c) Clinical and operative skills, (d) Teaching skills and (e) Dissertation.

a) **Personal Attitudes.** The essential items are:

- Caring attitudes
- Initiative
- Organisational ability
- Potential to cope with stressful situations and undertake responsibility.
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues.
- Ability to work in team.
- A critical enquiring approach to the acquisition of knowledge.

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

- b) **Acquisition of Knowledge** : The methods used comprise of 'Log Book' which records participation in various teaching / learning activities by the students. The number of activities, attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

Journal Review Meeting (Journal Club) : The ability to do literature search , in depth study, presentation skills and use of audio-visual aids are to be assessed.

Seminars / Symposia : The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio-visual aids are to be assessed using a checklist.

Clinico-pathological conferences : This should be multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a checklist similar to that used for a seminar.

Medical audit : Periodic morbidity and mortality meetings be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

c) **Clinical skills**

Day to Day work : Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' punctuality, analytical ability and communication skills.

Clinical Meetings : Candidates should periodically present cases to his peers and faculty members. This should be assessed using a checklist.

Clinical and Procedural skills : The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the logbook.

- d) **Teaching skills** : Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any..
- e) **Dissertation in the Department** : Periodic presentations are to be made in the department. Initially the topic selected is to be presented before submission to the University for registration, again before finalisation for critical evaluation and another before final submission of the completed work (evaluation sheet 2).
- f) **Periodic tests** : The departments may conduct three tests, two of them be annual tests, one at the end of first year and other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.
- g) **Work diary / Log Book** : Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.
- h) **Records** : Records. Logbooks and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log book

The logbook is a month wise record of the important activities of the candidates during his / her training. Internal assessment should be based on the evaluation of the logbook. Collectively, logbooks are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Final Assessment

All the papers to be set by 3 internal examiners jointly and moderated by one external examiner.

a) Theory	50%
Paper I	Basic sciences & radiation physics.
Paper II	CVS Resp.G IT (including Hepato biliary), Endocrine.
Paper III	Genitourinary Retro peritoneum, CNS, Musculoskeletal system, Obst.&Gynae, ENT & Eye.
Paper IVs	Recent advances & nuclear medicine.

All papers would consist of short answer question covering all aspects of the course.

b) Practical	50%	
1.	One long & two short cases	50%
2.	Film Quiz 40-50 spots	25%
3.	Radiation Physics	5%
4.	Equipment & accessory related to Radiology and contrast	5%
5.	Radiological & imaging procedure	10%
6.	Gross pathology	5%

THESIS FOR MD RADIO DIAGNOSIS AND IMAGING:

Objectives

1. The student would be able to demonstrate capability in research by planning, conducting systematic scientific inquiry, data analysis and derive conclusions.
2. Understand statistical methods used for evaluating an imaging modality and comparing two or more imaging modalities.

Dissertation

1. Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.
2. The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of research study, collection of data, critical analysis, comparison of results and drawing conclusions.
3. Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.
4. Such synopsis shall be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.
5. The study should be approved by the Institution Ethics Committee.
6. The dissertation should be written under the following headings:

a) Introduction	b) Aims or Objectives of study
c) Review of Literature	d) Material and Methods
e) Results	f) Discussion
g) Conclusion	h) Summary
i) References (Vancouver style)	j) Tables
k) Annexures	
7. The written text of dissertation shall not be less than 50 pages and shall not exceed 100 pages excluding references, tables, questionnaires and

other annexures. It should be neatly typed in double line spacing on one side of the paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the institution.

8. Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination on or before the dates notified by the University.
9. The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.



BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

Program

MD Respiratory Medicine

(Revised with effect from 2019-2020 onwards)

INTRODUCTION

The Department of Respiratory Medicine in AIMS started functioning in the year 1998. The department has many unique features. For the first time in Kerala, a full-fledged Respiratory Medicine unit started functioning with all modern facilities. Since then it functions as an apex referral center, not only for Kerala, but also for South India.

It is equipped with specialized services like video bronchoscopy, non-invasive ventilator, computerized spirometry, Lung diffusion study, polysomnography, ventilation perfusion scanning, bronchial artery embolisation, immunotherapy, video-thoracoscopy and critical care facilities. Since 2004, it trains students for national Board examination (Dip.NB). The Department has the track records of conducting CME programs, workshops and national conferences targeting the pulmonary physicians and Post Graduate students. The Department also undertakes funded research projects.

Need and Scope of MD Course in TB & Respiratory Diseases

Lung disease is a major cause of morbidity and mortality all over the world. Tuberculosis, which primarily involves the lungs, is reported in 1.3 to 2.5 percent of general population. The recent threat of Acquired Immuno Deficiency Syndrome (AIDS) has further aggravated the tuberculosis problem, globally and is a major problem in our country.

Besides tuberculosis, there is a heavy burden of non-tuberculous lung diseases and respiratory emergencies. Diseases such as bronchial asthma, chronic bronchitis, respiratory infections, lung cancer and others, account for about 70 percent for the lung diseases seen in any large hospital in India. Asthma alone may affect 5-7 percent of adults & about 10 percent of children. Occurrence of occupational and environmental hazards has alone increased. The Bhopal gas tragedy is only one example of such disasters. Respiratory failure secondary to infections, road accidents and other trauma, poisoning and intoxication, medical disorders, and several other conditions, may account for a heavy mortality. Tobacco-smoking, a widely prevalent habit, is the major cause of many lung diseases in India, responsible for 7 to 13 million patients of chronic obstructive pulmonary disease (COPD) and 0.11 to 0.21 million COPD deaths.

There is a great need of comprehensive training of physicians in this specialty, empowering them with the skill and knowledge of specialized diagnostic and therapeutic services in respiratory medicine to be catered at all levels of health care delivery.

The training of a physician at the postdoctoral level is to prepare him/her for being a consultant and a teacher or a research worker. The curriculum for TB & Respiratory Diseases is, designed to impart an intensive clinical training to students (MBBS) who qualify the screening examinations for admission to this course. He/ She is also given a good insight in the applied basic medical sciences such as physiology pathology, microbiology, biochemistry, immunology, pharmacology, biophysics, epidemiology and biostatistics.

Goals

The essential goal of the Programme is to produce post graduate fellows who should

- i. Recognize the importance of pulmonary and critical care in the context of the health needs of the community and the national priorities in the health sector.
- ii. Practice pulmonary and critical care ethically and in accordance with the principles of primary health care.
- iii. Demonstrate sufficient understanding of basic sciences in pulmonary and Critical Care Medicine appropriate to the level of postgraduate training.
- iv. Identify social, economical, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/ strategies.
- v. Diagnose and manage pulmonary and critical care disease on the basis of clinical assessment, and appropriately selected and conducted investigations.
- vi. Plan and advice measures for the prevention and rehabilitation of patients suffering from respiratory diseases and disability.
- vii. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.
- viii. Play the assigned role in the implementation of National Tuberculosis and other health programmes effectively and responsibility.
- ix. Organize and supervise the chosen/ assigned health care services demonstrating adequate managerial skills in the field situation.
- x. Develop skills as a self-directed learner, recognize continuing educational needs: select and use appropriate learning resources.
- xi. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyse relevant published research literature.

Objectives:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the three-year course. The Objectives may be considered under the subheadings.

1. Knowledge (Cognitive domain)
2. Skills (Psycho motor domain)
3. Human Values, Ethical practice and Communication skills.

Program Outcomes

PO1 Recognize the importance of pulmonary and critical care in the context of the health needs of the community and the national priorities in the health sector.

PO2 Practice pulmonary and critical care ethically and in accordance with the principles of primary health care.

PO3 Demonstrate sufficient understanding of basic sciences in pulmonary and Critical Care Medicine appropriate to the level of postgraduate training.

PO4 Identify social, economical, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and promotive measures/ strategies.

PO5 Diagnose and manage pulmonary and critical care disease on the basis of clinical assessment, and appropriately selected and conducted investigations.

PO6 Plan and advice measures for the prevention and rehabilitation of patients suffering from respiratory diseases and disability.

PO7 Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.

PO8 Play the assigned role in the implementation of National Tuberculosis and other health programmes effectively and responsibility.

PO9 Organize and supervise the chosen/ assigned health care services demonstrating adequate managerial skills in the field situation.

PO10 effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

PO11 effectively communicate with colleagues.

Program Specific Outcomes

PSO1 Take a proper clinical history, examine the patient, perform essential diagnostic procedures, order relevant tests and interpret the results to come to a reasonable diagnosis about the surgical condition

PSO2 Perform procedures like Lymph node FNAC, Biopsy, Pleurocentesis, ICD, Pleural Biopsy, Medical Pleurodesis, Lung Biopsy, Pig tail catheterization, ICD insertion, Intubations etc.

PSO3 Provide basic and advanced life saving support services (BLS & ALS) in emergency situations

PSO4 Perform daily Out patient services including patient screening and disease determination.

PSO5 Monitoring patients in ward and in ICUs

PSO6 Preoperative evaluation for fitness for surgical procedures

PSO7 Describe aetiology, pathophysiology, principles of diagnosis and management of common respiratory problems including emergencies, in adults.

PSO8 Participate in community out reach activities like camps, school screening and public education.

PSO9 Participate in department research activities.

PSO10 Prescribe medications for various ailments and follow up patients to understand outcomes.

PSO11 Present original research article in state conference/National/international conference.

PSO12 To do thesis work in the field of respiratory medicine under guidance of senior faculty.

PSO13 Teach junior post graduates, undergraduates and respiratory therapy students about respiratory medicine

COMPONENTS OF THE POSTGRADUATE CURRICULUM:

The major components of the Postgraduate curriculum shall be:

- Theoretical knowledge
- Practical and clinical skills
- Thesis skills.

- Attitudes including communication skills.
- Training in research methodology

Knowledge:

Objectives related to knowledge and higher cognitive abilities expected to be achieved during the course are given below. At the end of training, the candidate must be able to:

- Describe aetiology, pathophysiology, principles of diagnosis and management of common respiratory problems including emergencies, in adults.
- Describe Lung malignancies and their management including prevention.
- Demonstrate understanding of basic sciences relevant to Respiratory Medicine.
- Recognize conditions that may be outside the area of his specialty/competence and to refer them to proper specialist.
- Update himself by self study and by attending courses, conferences and seminars relevant to Respiratory Medicine
- Teach and guide his team, colleagues and other students.
- Undertake audit and carry out research with the aim of publishing his work and presenting his work at various scientific fora.

Skills

- Take a proper clinical history, examine the patient, perform essential diagnostic procedures , order relevant tests and interpret the results to come to a reasonable diagnosis about the surgical condition.
- Perform procedures like Lymph node FNAC, Biopsy, Pleurocentesis, ICD, Pleural Biopsy, Medical Pleurodesis, Lung Biopsy, Pig tail catheterization, ICD insertion, Intubations etc.
- Provide basic and advanced life saving support services (BLS & ALS) in emergency situations.
- Monitoring patients in ward and in ICUs
- Preoperative evaluation for fitness for surgical procedures

Human values, Ethical practice and communication skills

- Adopt ethical principles in all aspects of his medical practice. Professional honesty and integrity are to be fostered. Medical care is to be delivered irrespective of the social status, caste, reed or religion of the patient.
- Develop communication skills and to obtain an informed consent from the patient.
- Provide leadership and get the best out of his team.
- Apply high moral and ethical standards while carrying out human or animal research.
- Accept the limitations of his knowledge and skill and to ask for help from colleagues when needed.
- Respect patients' rights and privileges

Essential Knowledge

Respiratory Medicine covers common Respiratory disorders like pleural diseases, airway diseases, pulmonary vascular diseases, infectious disorders, Tuberculosis, interstitial lung diseases, occupational lung disease, sleep apnea, Lung malignancies and so on. A Respiratory Physician should also have knowledge of some common problems in allied specialties. Furthermore, he should be familiar with complications, current controversies and recent advances in these topics.

The topics are considered under:

- Basic sciences
- General Topic
- Respiratory Medicine topics

Basic sciences include anatomy, physiology, biochemistry, microbiology and pathology as found in current textbooks. The stress is on applied anatomy, pathophysiology and respiratory pathology and respiratory physiology.

General topics including the following

Clinical history and examination - detailed systematic history taking, clinical examination of various systems, coming to a provisional working diagnosis.
Rationale of diagnostic tests - Ordering diagnostic test with prioritizing the needs, based on the clinical, hospital and the patient's socioeconomic conditions.
Informed consent / Medico legal cases - Understanding the implications of acts of omission and commission in practice. Issues regarding Consumer protection Act.- Implications in a medico- legal case like accidents assaults etc.
Communication skills with the patient - Understanding clarity in communication, compassionate explanations and giving emotional support to at the time of suffering and bereavement.
Principles of medical audit - Understanding the audit process and outcome. Methods adopted for the same. Basic statistics to understand and critically evaluate published research paper
Principles of evidence based medicine - Understanding journal based literature study; the value of textbook, reference book articles; value of review articles; original articles and their critical assessment. Understanding the value of retrospective, prospective, randomized controlled and blinded studies.- Understanding the principles and meanings of various biostatistical tests applied research studies

Medical ethics / Social responsibilities as a physician
Use of computers in medicine
Health insurance, Health Care financing Few lectures or a seminar on basic understanding of pharmacoeconomics.
Undertaking clinical audit
Prospective data collection/ writing case reports and clinical papers
Giving presentation / Computer presentation
Principles in Prevention of Nosocomial infections
Fluid electrolyte balance/Acid–Base metabolism- The body fluid compartments; metabolism of water and electrolytes; factors maintaining homeostasis; acidosis and alkalosis
Blood transfusion- Blood grouping; cross matching; blood component therapy; complications of blood transfusion; blood substitutes; auto transfusions; cell savers.
Principles of Oncology- cell kinetics; causation of tumours; principles of oncologic surgery, radiotherapy and chemotherapy, paraneoplastic syndromes; cancer pain management; palliative care.
Shock:- types of shock; diagnosis; resuscitation; pharmacological & ventilatory management.

Topics on Respiratory diseases

I. Anatomy:

1. Embryology of heart and lungs
2. Anatomy of Thoracic cage and diaphragm
3. Anatomy of pleura
4. Segmental anatomy of lung
5. Pulmonary arterial and venous system
6. Lymphatics of lung
7. Nerve supply of lungs and pleura
8. Ultra structure of lung
9. Lung cell dynamics and culturing
10. Anatomy of heart and great vessels
11. Mediastinum divisions, contents
12. Anatomy of structures in the mediastinum Thymus, lymph nodes, oesophagus, lymphatics nerves
13. Osteology of ribs and vertebrae
14. Anatomy of thoracic inlet.

II. Physiology:

1. Physiology of respiration and its control
2. Lung function tests
3. Pathophysiology of cor pulmonale
4. Pathophysiology of respiratory failure
5. Physiology of cardiac output and pulmonary circulation
6. Electrolytes and fluid balance
7. Pulmonary Physiology of high altitude

III. Pharmacology:

1. Pharmacology of anti-tubercular agents
2. Pharmacology of expectorants and anti-tussives
3. Pharmacology of bronchodilators
4. Pharmacological mechanisms in bronchial asthma
5. Anti-viral agents
6. Pharmacology of radio pharmaceuticals used in diagnosis of respiratory diseases
7. Pharmacology of cancer chemotherapy

IV. Pathology:

1. Pathogenesis and pathology of tuberculosis (Pulmonary and extra pulmonary)
2. Pathology of non-tubercular chest diseases
3. Fundamentals of genetics and inherited pulmonary diseases
4. Pathology of viral and mycotic lung diseases
5. Pathology of occupational lung diseases
6. Pathology of Neoplasms of lung, pleura and mediastinum
7. Pathology of Pulmonary Hypertension

8. Pathology of interstitial lung diseases
9. Pulmonary manifestations in systemic disease.

V. Microbiology:

1. Microbiology of Tubercle bacillus-Classification, cultural characteristics, identifications, laboratory diagnosis including opportunistic mycobacteria.
2. Microbiology of viruses, which involve respiratory tract – classifications, culture methods, Laboratory diagnosis.
3. Mycotic agents, which involve respiratory tract.
4. Allergy and immunology with reference to Bronchial Asthma
5. Microbiology of bacterial respiratory infections
6. Anaerobic lung infections

VI. Preventive Medicine:

1. Epidemiology of tuberculosis
2. National Tuberculosis control programme
3. Epidemiology of non-tubercular diseases of chest.
4. Air pollution and air quality standards, Methods of preventing of air pollution
5. Medical statistics – Methods of investigation planning, collection of data, analysis of data, statistical analysis.
6. Entomology of – filaria, House dust mite, and other vectors causing pulmonary diseases

Recommended Syllabus for Part II

1. History of tuberculosis and chest disease
2. Clinical aspects and treatment of pulmonary tuberculosis
3. Clinical aspects and treatment of extra pulmonary tuberculosis
4. Clinical aspects and treatment of non-tubercular chest disease including mycotic and viral diseases
5. Respiratory allergy and clinical immunology
6. Clinical aspects of occupational lungs disease
7. Physical therapy non-respiratory disease and rehabilitation of chronic respiratory patients.
8. Systemic manifestations of pulmonary disease and pulmonary manifestations of systemic disease.
9. Invasive and non-invasive investigative procedure in respiratory disease.
10. Radio pharmaceuticals in respiratory disease
11. Pulmonary radiology
12. Radiotherapy in lung cancer
13. Inherited pulmonary disorders
14. Recent trends in respiratory diseases.

Regulations for MD in TB & Respiratory Diseases

Name of course: MD in TB & Respiratory Diseases

1. Qualification for Admission: (Same as for other MD Degree Kerala University)
 - (a) Only graduate of modern Medicine (M.B.B.S) are eligible.
 - (b) One year of compulsory rotary internship should be completed.
2. Duration of course: (Same as for others MD Courses of Kerala University)
 - (a) Three years for fresh graduates
 - (b) Two years for those who have diploma qualification
3. Teaching and Training:
 - (a) Students will be posted as full time students in the departments of TB & Respiratory Disease. They will work in the concerned wards, attend to bedside clinics, participate in clinical club, group discussions, seminars attend the chest-thoracic and allergy clinic conducted by the department.
 - (b) Candidates will have to participate in the Under Graduation teaching to get experience in the methods of teaching medical students.
 - (c) Posting for 15 days in the National Tuberculosis Institute Bangalore to study the various aspects of the National Tuberculosis Control Programme
 - (d) Posting for 7 days at the Tuberculosis Chemotherapy Research Center, Madras to study the methodology in Tuberculosis Research.
 - (e) Posting for 7 days for at the out-patient of the Tuberculosis Training and Demonstration Center Trivandrum to the working of the District T.B Control Programme.
 - (f) Posting for 30 days in the Cardio-Vascular and Thoracic surgery Department of Medical College.
 - (g) Afternoon lecture demonstration classes in Anatomy Physiology, Pharmacology, Microbiology Biophysics preventive and social medicine and medical status during the first year of study.
 - (h) Attend case demonstration and classes in Orthopedic, Dermatology, Ophthalmology, Medical Neurology, Gastro enterology, Physical Medicine and Rehabilitation, Radiology and Nuclear Medicine as and when they are arranged.

- (i) Posting for 2 months under General Medicine Department (in-patient and out-patient work)
5. Thesis: (same as for other M.D courses in Kerala University) Every candidate will have to work on a project assigned to him and submit a “ Thesis” on it after completion of the work. There will be a guide and co- guide for the work. This inparts training in the methodology of research, collection of data, statistical analysis, and its proper presentation. The Thesis should be approved 3 months before the candidate is allowed to take the final examination

Essential skills

The following list is drawn up with a view to specifying basic minimum skills to be acquired. While an attempt has been made to specify the year wise distribution of the learning of skills (in the latter part of curriculum), it is recognized that the process is a continuous one. The year wise distribution of the skills recommended are to be used as general guideline.

Provision of training in various specialty subjects has been made during the second year of the course. The list within the tables, indicates the procedures that the students should, by the end of the course, be able to perform independently (PI) by himself / herself , performed with assistance (PA) ,observed (O) or have assisted performing faculty member.

Skills may be considered under the following headings

- a) Basic skills
- b) Ward procedures
- c) ICU procedures
- d) Emergency room procedures

a) Basic skills

The student should have acquired certain skills during his under-graduation and internship. These skills have to be reinforced at the beginning of the training period.

Procedure	Category	Year	Number

Insertion of I.V.lines, nasogastric tubes, urinary catheters, etc	PI	1	75
History & Physical Examination	PI	1	250

b) Ward procedures

Ward work forms an important part of the training of the training of the surgeons. In addition to the routine examination of the patient with proper recording of findings, diligent practice of the following is recommended.

Procedure	Category	Year	Number
Ability to teach undergraduates and interns	PI	1	NA
Blood sampling – Venous and arterial	PI	1	NA
Communication skills with patients, relatives, colleagues and paramedical staff	PI	1	NA
Ordering laboratory and Radiological investigations and interpretation of report	PI	1	NA
Proficiency in common ward procedures	PI	1	NA
FNAC/Trucut biopsy	PI	1	10
Hand held Doppler for varicose veins/arterial disease	PI	1	10
Per-rectal examination and Proctoscopy	PI	1	NA
Thoracocentesis, Tube thoracostomy	PI	II	5
Universal precautions against communicable diseases	PI	1	NA

NA: Not applicable

C) ICU Procedures

Procedure	Category	Year	Number
Insertion of Arterial lines	PI	II	10
Insertion of central venous lines	PI	II	10
Insertion of Endotracheal tubes	PI	II	10
Intercostal drainage	PI	II	5
Tracheostomy	PI	1	2
Working knowledge of ventilators and various monitors	PI	1	NA
Interpretation of Arterial Blood gases	PI	1	NA
Correction of Electrolyte disturbances	PI	I	NA

d) Emergency Room Procedures

Procedure	Category	Year	Number
Arterial and venous lines	PI	1	5
Cardiopulmonary Resuscitation	PI	I	5
Management of Airway obstruction	PI	I	5

Management of Shock and Cardiac / Respiratory failure	PI	I	5
Emergency tube thoracostomy	PI	II	15

e) Preoperative work up

Procedure	Category	Year	Number
Basic evaluation for common surgical procedures	PI	II	10
Evaluation for major procedures, cardiac, thoracic surgery, lung resection	PI	II	10
Estimating post operative lung function thru preop screening	PI	II	10
Identification of high risk individuals, grading the risk	PI	II	10
Preoperative management of patients with respiratory diseases	PI	II	10

f) Post operative Care

Procedure	Category	Year	Number
Airway management	PI	II	10
Chest Physiotherapy	PI	II	25
Management of epidural analgesia	PI	II	10
Management of postoperative hypotension and hypertension	PI	I	20
Post operative pain control	PI	II	25
Skills for proper Fluid and Antibiotic management	PI	II	50
Care of Thoracostomy tube	PI	II	50

g) Minor O.T. procedures

Procedure	Category	Year	Number
Bronchoscopy	PI	II	20
Drainage of cervical cold abscess	PI	I	10
FNAC lymph node and other soft tissue swellings	PI	I	10
Pleural biopsy (closed)	PI	II	5
Pleural biopsy using thoracoscope	PA	II	5
Lung biopsy, FNCA	PI	I	10
Insertion of intercostals tube for pneumothorax, pleural effusion, empyema etc.	PI	II	20
Insertion of pig tail for pleural diseases	PI	II	5
Drainage of loculated pleural effusion under radiological guidance	PI	III	10
Drainage of loculated pleural effusion under through thoracoscope	PA	II	5

h) Special procedures

Procedure	Category	Year	Number
Performance of spirometry	PI	I	10
Performance of diffusion studies of lung	PI	I	5
Performance of sleep study for subjects suspected to have obstructive sleep apnea	PI	I	5
Allergy skin testing	PI	I	25
Immunotherapy	PI	III	10
6 minute walk test	PI	I	10
Mantoux test	PI	I	10

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full time student. Each year should be taken as a unit for the purpose of calculating attendance. Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons. A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below. The students shall enter in the Log Book relevant details of all teaching/learning activities.

1. Lectures:

Lectures are to be kept to a minimum. Lectures may be didactic or integrated.

a) **Didactic Lectures:** Recommended for selected common topics for postgraduate students of all specialties. Few topics are suggested as examples:

- 1) Bio-statistics
- 2) Research Methods
- 3) Medical code of Conduct and Medical Ethics
- 4) Communication Skills etc.

These topics may preferably taken up in the first few months of the Ist year. Few lectures or other type of exposure to human behavior studies shall be taken.

b) **Integrated Lectures:**

These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes mellitus, Thyroid etc.

2. Journal Club

Recommended to be held once a month. All the PG students are expected to attend and actively participate in discussion. Further, every candidate must make a presentation from the allotted journal (s), selected articles at least four times a year. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV).

3. Subject Seminar:

Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion. Further, every candidate must present on selected topics at least four times a year and total of 12 seminar presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.

4. Student Symposium:

Recommended as an optional multi disciplinary Programme. The evaluation may be similar to that described for subject seminar.

5. Ward Rounds: Ward rounds may be service or teaching rounds.

- a) Service Rounds: Postgraduate students and Interns should do every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
- b) Teaching Rounds: Every unit should have grand rounds for teaching purpose. A diary should be maintained for day-to-day activities by the students.

Entries of (a) and (b) should be made in the Log book.

6. Clinico – Pathological Conference: Recommended once in three months for all post graduate students. Presentation to be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

7. Inter Departmental Meetings. Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a month. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

- a) Pathology: Interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of department and Pathology departments.
 - b) Radio-diagnosis: Interesting cases and the imaging modalities should be discussed.
8. Teaching Skills: Postgraduate students must teach under graduate students (Eg. Medical,Dental,Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by the faculty as well students. (See model check in Chapter IV). Record of their participation to be kept in Log book. Training of postgraduate students in Educational Science and Technology is recommended. Continuing Medical Education Programmes (CME): Recommended that at least 2 National/State level CME programmes should be attended by each student in 3 years.
9. Conferences: Recommended that at least 2 National/State level conferences should be attended by each student in 3 years. The candidates are encouraged to present papers at these conferences/CME

Rotation and posting in other departments

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic subjects, allied department and specialty departments is given below.

In the first year, during the morning session, student should work in the parent department. It is recommended that 2 years and 3 months to be spent in parent department and 9 months in allied and specialty departments. Depending on the time and opportunities available, some of the procedures listed for second year activity can be shifted to the first or third year. Students must be on call on a regular basis.

Basic science

Basic science should be an essential part of training. It should be done as concurrent studies during the 1st year of training. It is recommended that the candidate spends at least one hour daily, in the afternoons, for the first six months in the respective departments learning basic science relevant to pulmonary diseases. Topics for study to include anatomy, Physiology, Pathology, Microbiology, Pharmacology, Critical care and Radiology

Radiology: adequate exposure to modern imaging modalities like USG, CT, MRI and angiography

Specialty postings

Postings to other specialty departments will be during the second year. The departments and duration of postings are as under:

Department	duration
Internal medicine	2 months
Cardiology	1 month
Critical care Unit and OT	2 months
Radiology	1 month
Oncology	15 days
CVTS	15 days
Nephrology	15 days
Microbiology	15 days
Pathology	15 days
Community Medicine	15 days

Dissertation

Every candidate pursuing MD Degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of a dissertation

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within 6 months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the university.

No change in the dissertation topic or Guide shall be made without prior approval of the university.

The dissertation should be written under the following headings

- i) Introduction
- ii) Aims or objectives of study
- iii) Review of literature

- iv) Materials and methods
- v) Results
- vi) Discussion
- vii) Conclusion
- viii) Summary
- ix) References
- x) Tables
- xi) Annexures

The written text of dissertation shall not be less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the Department and head of the Institution.

Four copies of dissertation thus prepared along with the same matter on CD shall be submitted to the University, six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is essential precondition for a candidate to appear in the University examination.

For some more details regarding Guide etc., please see Chapter 1 and for books on research methodology, ethics etc., see Chapter IV.

Monitoring learning process

It is essential to monitor the learning process of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching/learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Chapter IV.

The learning outcomes to be assessed should include (i) Personal attitude (ii) acquisition of knowledge (iii) Clinical and operative skills (iv) Teaching skills and (v) Dissertation.

i) Personal attitudes. The essential items are

- Caring attitude
- Initiative
- Organizational ability
- Potential to cope with stressful situations and undertake responsibility
- Trustworthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Acquisition of Knowledge: The methods used comprise of Log Book which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities if so, desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study. Presentation skills, and use of audio visual aids are to be assessed. The assessment is made by Faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio visual aids are to be assessed using a checklist (see Model Checklist II, Chapter IV)

Clinico - pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter (s) are to be assessed using a check list similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

iii) Clinical skills

Day-to-Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model checklist IV, Chapter IV).

Clinical and procedure skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the logbook. (Table No.3, Chapter IV)

iv) Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist V, Chapter IV)

v) Dissertation in the department: Periodic presentation are to be made in the department. Initially the topic is to be presented before submission to the University for registration, again before finalisation for critical evaluation and another before final submission of the completed work (See Model Checklist VI & VII, Chapter IV)

vi) Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

vii) Work diary / Log Book – Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

viii) Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log book

The log book is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentation and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1,2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and Head of the Department. In extreme cases of default, the departmental committee may recommend that defaulting candidate be withheld from appearing for the examination, if she / he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

COURCES:

Paper - I Basic Science (Course Code – U19MDRM01)

- CO1: To Understand Pulmonary circulation
- CO2: Development of Lung
- CO3: Pathophysiology of Pleural Fluid Formation
- CO4: Diagnostic and Therapeutic utilisation of Bronchoscopy
- CO5: Diagnosis and management of Pulmonary embolism
- CO6: Identification of congenital malformation in Lung

Anatomy:

Embryology of heart and lungs

- Anatomy of Thoracic cage and diaphragm
- Anatomy of pleura
- Segmental anatomy of lung
- Pulmonary arterial and venous system
- Lymphatics of lung
- Nerve supply of lungs and pleura
- Ultra structure of lung
- Lung cell dynamics and culturing
- Anatomy of heart and great vessels
- Mediastinum divisions, contents
- Anatomy of structures in the mediastinum Thymus, lymph nodes, oesophagus, lymphatics nerves
- Osteology of ribs and vertebrae
- Anatomy of thoracic inlet.

Physiology:

Physiology of respiration and its control

- Lung function rests
- Pathophysiology of cor pulmonale
- Pathophysiology of respiratory failure
- Physiology of cardiac output and pulmonary circulation
- Electrolytes and fluid balance
- Pulmonary Physiology of high altitude

Pharmacology:

Pharmacology of anti-tubercular agents

- Pharmacology of expectorants and anti-tussives
- Pharmacology of bronchodilators
- Pharmacological mechanisms in bronchial asthma
- Anti-viral agents
- Pharmacology of radio pharmaceuticals used in diagnosis of respiratory diseases
- Pharmacology of cancer chemotherapy

Pathology:

- Pathogenesis and pathology of tuberculosis (Pulmonary and extra pulmonary)
 - Pathology of non-tubercular chest diseases
 - Fundamentals of genetics and inherited pulmonary diseases
 - Pathology of viral and mycotic lung diseases
 - Pathology of occupational lung diseases
 - Pathology of Neoplasms of lung, pleura and mediastinum
 - Pathology of Pulmonary Hypertension
 - Pathology of interstitial lung diseases
 - Pulmonary manifestations in systemic disease.

Microbiology:

- Microbiology of Tubercle bacillus-Classification, cultural characteristics, identifications, laboratory diagnosis including opportunistic mycobacteria.**
- Microbiology of viruses, which involve respiratory tract – classifications, culture methods, Laboratory diagnosis.
- Mycotic agents, which involve respiratory tract.
 - Allergy and immunology with reference to Bronchial Asthma
 - Microbiology of bacterial respiratory infections

Anaerobic lung infections

Paper - II TB (Course Code U19MDRM02)

- CO1: Clinical Features of Pulmonary Tuberculosis
- CO2: To identify MDR suspects
- CO3: To understand infection control measures
- CO4: Diagnostic modalities of TB
- CO5: Early identification and management of PTB

CO6: To prevent the MDR TB ,and early idenification and management
CO7: Rapid diagnostic modality of TB Detection

History of tuberculosis and chest disease
Clinical aspects and treatment of pulmonary tuberculosis
Clinical aspects and treatment of extra pulmonary tuberculosis
Statistics of Tuberculosis in India
Clinical aspects and treatment of non-tubercular chest disease including mycotic and viral diseases
Atypical presentations of tuberculosis
Respiratory allergy and clinical immunology
Clinical aspects of occupational lungs disease
Physical therapy non-respiratory disease and rehabilitation of chronic respiratory patients.
Systemic manifestations of pulmonary disease and pulmonary manifestations of systemic disease.
Invasive and non-invasive investigative procedure in respiratory disease.
Radio pharmaceuticals in respiratory disease
Feasibility of Bronchoalveolar lavage in patients
Pulmonary radiology
Radiotherapy in lung cancer
Inherited pulmonary disorders

Paper - III Non Tubercular Chest Diseases (Course Code: U19MDRM03)

CO1: Types of Respiratory failure
CO2: Clinical manifestations of Pulmonary disease in immunocompromised patients
CO3: Mechanism and Clinical Features of Bronchiectasis
CO4: Management of Respiratory failures
CO5:Early diagnosis and management of Pneumonia in Immunocompromised
CO6: Prevention of Recurrent infection and Exacerbation of Bronchiecatsis

Non- Tuberculous infections of the lungs

Upper respiratory tract infections

Approach to a patient with pulmonary infection.

Community acquired pneumonias

Approach to atypical pnumonia

Nosocomial pneumonias

Unusual and atypical pneumonias including bacterial, viral, fungal and parasitic

Bronchiectasis and lung abscess

Acquired immunodeficiency syndrome and opportunistic infections in an immunocompromised host.

Bronchitis and bronchiolitis

Non- infectious Lung Diseases

Interstitial Lung Disorders

Connective tissue disorders and lung diseases

Immune defense mechanisms of the lung

Sarcoidosis

Hypersensitivity pneumonias

Lung involvement in connective tissue disorders

Eosinophilic pneumonias and tropical eosinophilia

Pulmonary vasculitides

Reactions of the interstitial space to injury

Pulmonary fibrosis

Long term management of cystic fibrosis

Occupational pulmonary diseases

Interstitial diseases of other aetiologies

Drug induced pulmonary diseases

Aspiration and inhalational (non-occupational diseases of the lung

Pulmonary Circulatory disorders

Pulmonary edema

Pulmonary hypertension and cor pulmonale

Pulmonary thromboembolic diseases

Cardiac problems in a pulmonary patient and pulmonary diseases produced by cardiac diseases

Obstructive diseases of the lungs

Asthma

Chronic obstructive lung disease

Pulmonary rehabilitation

Cancer of the lungs

Epidemiology, pathology, natural history, clinical picture and staging of the carcinoma of lungs and other tumors

Approach to the diagnosis of a pulmonary nodule.

Medical management and surgical treatment of lung cancer.

Radiation therapy in the management of carcinoma lung

Paraneoplastic syndromes

Diseases of the mediastinum

Benign and malignant tumors

Non-neoplastic disorders

Disorders of the pleura

Pleural dynamics and effusions

Non-neoplastic and neoplastic pleural diseases

Pneumothorax

Pyothorax and broncho-pleural fistula and its complications.

Paper - IV Recent Advances (Course Code: U19MDRM04)

CO1: Difficult to Treat Asthma

CO2: Newer Inhalers in COPD

CO3: Pulmonary Function Test

CO4: Diagnostic modalities of TB

CO5: Evaluation and Treatment of Difficult Asthma and Use of Bronchial Thermoplasty

CO6: Management of Advanced COPD

CO7: Preoperative evaluation by Lung function testing with CPET

Knowledge about latest treatment modalities , Upcoming EBUS treatment , and knowledge about latest clinical research journals

Soft Skills (Course Code: U19MDRM05) Elective Course

CO1: Acquisition of ability to conduct a scientific study.

CO2: Acquisition of skills in administration of a department.

CO3: Skills in biomedical ethics and proper etiquette.

CO4: Ability to function as the member of a team.

CO5: Ability to organise public health programs.

Scheme of Examination

i) Theory

There shall be four question papers, each of three hours duration. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Model question papers are given below

Journals for reference

1	American Journal of Respiratory and Critical care Medicine
2	Chest (Foreign)
3	Clinics in Chest Medicine (Foreign)
4	Critical Care Medicine (Foreign)
5	Current Opinion in Critical Care (Foreign)
6	Indian Journal of Chest Diseases and Allied Sciences (Indian)
7	Indian Journal of Tuberculosis (Indian)
8	Indian Journal of Critical Care (Indian)
9	Respiratory Medicine (Foreign)
10	International journal of tuberculosis and lung diseases
11	Journal of Bronchology
12	European Journal of respiratory Diseases

Recommended books

1	A Clinician's Guide to Tuberculosis	Michael D Iseman
2	100 Chest X-Ray problems	Corne, Jonathan
3	Addressing poverty in TB control	W H O
4	Advanced Study in Respiratory Therapy	Grenard, Steve
5	Asthma Vol.1 & 2	Peter J Barnes
6	Atlas of Infectious Diseases Vol.6 : Pleuropulmonary and Bronchial Infections	Simberkoff, Mihcael S
7	Atlas of Procedures in Respiratory Medicine	Gold, Warren M
8	Bone's Atlas of Pulmonary and Critical Care Medicine	Campbell, G Douglas
9	Bronchial Asthama	D.Behera
10	Bronchoscopy	Udaya B S Prakash
11	Chest Medicine : Essentials of Pulmonary and Critical Care Medicine	Ronald B George
12	Chest Medicine : Essentials of Pulmonary and Critical Care Medicine	Ronald B George
13	Chest Medicine : Essentials of Pulmonary and Critical Care Medicine	Ronald B George
14	CIBA Collection of Medical Illustrations : Respiratory System	Netter, Frank H
15	Clinical Cardiovascular and Pulmonary Physiology	Rosendorff, Clive

16	Clinical Respiratory Medicine	Albert, Richard K
17	Color Atlas of Respiratory Diseases	D Geraint James
18	Crofton and Douglas's Respiratory Diseases Vol.1 &2	Seaton, Anthony
19	Diagnosis of Diseases of the Chest Vol.1 & 2	Robert G Fraser
20	Diseases of the Lung : Radiologic and Pathologic Correlations	Nestor L Muller
21	Felson's Principles of Chest Roentgenology	Lawrence R Goodman
22	Fishman's Pulmonary Diseases and Disorders Vol 1&2	Fishman, Alfred
23	Fraser and Pare's Diagnosis of Diseases of the Chest Vol.1 to 4	Fraser, R S
24	High-Resolution CT of the Lung	W.Richard Webb
25	Intensive Respiratory Care	John M Luce
26	Interpretation of Pulmonary Function Tests	Robert E Hyatt
27	Interstitial Lung Disease	Schwarz, Marvin I
28	Interventional Bronchoscopy	Bolliger, C T
29	Lung Function Tests	Hughes, J M B
30	Lung Sounds	Paul Forgacs
31	Management of Respiratory Tract Infections	John G Bartlett
32	Manual of Pulmonary Function Testing	Ruppel,Gregg L
33	Mechanical Ventilation : Clinical Applications and Pathophysiology	Papadakos, Peter J
34	Murray and Nadel's Textbook of Respiratory Medicine Vol 1&2	Mason, Robert J
35	Non-invasive Respiratory Support	Anita K Simonds
36	Nunn's Applied Respiratory Physiology	Lumb, Andrew B
37	Occupational Lung Diseases	W.Keith C Morgan
38	Pathology of Occupational Lung Disease	Andrew Churg
39	Patient Care in Respiratory Problems	Jane Secor
40	Physiotherapy in Respiratory Care :An evidence-based approach to respiratory and cardiac management	Hough, Alexandra
42	Pleural Diseases	Richard W Light
43	Preoperative Pulmonary Preparation	Peter M S Margand
44	Principles and Management of Tuberculosis	P.S.Shankar
45	Principles and Practice of Pulmonary Rehabilitation	Richard Casaburi
46	Principles and Practice of Sleep Medicine	Kryger, Meir H
47	Principles of Pulmonary Medicine	Steven E Weinberger
48	Progress in Pulmonary Medicine Vol.1 to 4	P.S.Shankar
49	Pulmonary Differential Diagnosis	Harold Zackon
50	Pulmonary Disease Diagnosis and Therapy	M Gabriel Khan
51	Pulmonary Diseases and Disorders	Alfred P Fishman
52	Pulmonary Medicine and Critical Care	Epstein, Paul E
53	Pulmonary Pathophysiology	John B West
54	Pulmonary Pathophysiology	Michael A Grippi
55	Pulmonary Rehabilitation : Guidelines to Success	John E Hodgkin
56	Radiology of the Chest and Related Conditions	Wright, Fred W
57	Recent Advances in Respiratory Medicine Vol :2	Sharma, S K

58	Respiratory Medicine in the Tropics	J.N.Pande
59	Respiratory Patient Care	Kanute P Rarey
60	Respiratory Physiology	West, John B
61	Respiratory Physiology	Cloutier, Michelle M
62	Synopsis of Diseases of the Chest	Richard S Fraser
63	Textbook of Pleural Diseases	Richard W Light
64	Textbook of Respiratory Medicine Vol.1 & 2	John F Murray
65	Textbook of Respiratory Medicine Vol.1 & 2	John F Murray
66	Timebomb : The Global Epidemic of Multi-Drug-Resistant Tuberculosis	Lee B Reichman
67	Tuberculosis	Rom, William N
68	Tuberculosis	Sharma SK
69	Tuberculosis and air travel: Guidelines for Prevention and Control	WHO
70	Tuberculosis and Nontuberculous Mycobacterial Infections	David Schlossberg
71	Tuberculosis Bacteriology : Organization and Practice	Collins C H
72	Tuberculosis Handbook	WHO
73	Tuberculosis of the Airways	W H O
74	Tumors of the Lung Vol.24	Mackay, Bruce
75	Yearbook of Pulmonary Disease	Gareth M Green

Model checklist for Assessment of Scientific papers for publications

Sl.No	Criteria	Distribution of marks	Marks awarded
1	Originality	10	
2	Clarity and quality of presentation	10	
3	Relevance	10	
4	Review of literature	10	
5	Quantum of works involved	15	
6	Methodology, sensitivity, sample size, controlled, not controlled study etc	25	
7	Advancement in knowledge	10	
	Total	90	

Signature of the evaluator

Name

Designation

Chapter IV

Monitoring Learning progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects.

The learning outcomes to be assessed should include: (i) Personal Attitudes,(ii) Acquisition of Knowledge, (iii) Clinical and operative skills, and (iv) Teaching skills.

i) Personal Attitudes. The essential items are:

- Caring attitudes
- Initiative
- Organisational ability
- Potential to cope with stressful situations and undertake responsibility
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Acquisition of Knowledge: The methods used comprise of Log Book which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities if so desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study. Presentation skills, and use of audio visual aids are to be assessed. The assessment is made by Faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in-depth study. The ability to do literature search, presentation skills and use of audio visual aids are to be assessed using a checklist (see Model Checklist II, Chapter IV)

Clinico - pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter (s) are to be assessed using a check list similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meetings are to be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

iii) Clinical skills

Day-to-Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model checklist IV, Chapter IV).

Clinical and procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation.

Particulars are recorded by the student in the logbook. (Table No.3, Chapter I

iv) Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist V, Chapter IV)

v) Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. In case of diploma courses of two-year duration, the departments may conduct two tests. One of them at the end of first year and the other in the second year three months before the final examination. The tests may include written papers, practicals/clinicals and viva voce.

vi) Work diary / Log Book – Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews,

seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

vii) Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log book

The log book is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentation and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1,2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she / he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

CHAPTER IV (CONTD.)

Format of Model Check Lists

Check List – I MODEL CHECK LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty / Observer:

Date

	Items for observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have been consulted					
4.	Whether other relevant publications consulted					
5.	Ability to respond to questions on the paper/subject					
6.	Audio-Visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					
9.	Any other observation					
	Total Score					

Check List – II

MODEL CHECK LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty / Observer:

Date

	Items for observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Whether other relevant publications consulted					
2.	Whether cross reference have been consulted					
3.	Completeness of Preparation					
4.	Clarity of presentation					
5.	Understanding of subjects					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio – Visual aids					
9.	Overall performance					
10.	Any other observation					
	Total Score					

Check List – III

MODEL CHECK LIST FOR EVALUATION OF CLINICAL WORK IN WARD/ OPD

(To be completed once a month by respective Unit Heads including posting in other departments)

Name of the Student:

Name of the Unit head :

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Bedside manners					
8.	Rapport with patients					
9.	Counseling patients relatives for blood donation or Post mortem and Case follow up					
10	Over all quality of Ward work					
11.	Total Score					

Check List – IV
EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the Student:

Name of the Faculty:

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Completeness of history					
2.	Whether all relevant point elicited					
3.	Clarity of presentation					
4.	Logical order					
5.	Mentioned all positive and negative points of importance					
6.	Accuracy of General physical examination					
7.	Whether all physical signs elicited correctly					
8.	Whether any major signs missed or misinterpreted					
9.	Diagnosis: Whether it follows logically from history and findings					
10	Investigations required					
	• Complete list					
	• Relevant order					
	• Interpretation of investigations					
11.	Ability to react questioning Whether it follows logically from history and findings					
12	Ability to defend diagnosis					
13.	Ability to justify differential diagnosis					
14	Others					
	Grand Total					

Check List – V

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACICE

Name of the Student:

Name of the Faculty:

Date

Sl No		Strong Point	Weak Point
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequence of ideas		
5.	The use of practical examples and /or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses A V aids appropriately		

Check List – VI
MODEL CHECK LIST FOR DISSERTATION PRESENTATIONS

Name of the Student:

Name of the Faculty:

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide and other faculty					
4.	Quality of protocol					
5.	Preparation of proforma					
	Total Score					

Check List – VII

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO – GUIDE

Name of the Student:

Name of the Faculty:

Date

Sl No	Items for observation during presentations	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Periodic consultation with guide / co-guide					
2.	Regular collection of case material					
3.	Depth of analysis / discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	Total Score					

LOG BOOK

Table – 1: Academic activities attended

Name:

Admission Year:

College:

Date	Type of Activity Specify Seminar, Journal Club, Presentation, UG Teaching	Particulars

LOG BOOK

Table – 2: Academic presentation made by the student

Name:

Admission Year

College:

Date	Topic	Type of Presentation
		Specify Seminar, Journal Club, Presentation, UG Teaching etc

LOG BOOK

Table –3: Diagnostic and therapeutic procedures performed

Name: _____ Admission Year _____

College: _____

Date	Name	ID No	Procedure	Category O, A, PA, PI*

* Key O - Washed up and observed
 A - Assisted a more senior Surgeon
 PA –Performed procedure under the direct supervision of a senior surgeon
 PI – performed independently

Model Overall Assessment Sheet

Name of the college:

Academic Year

Sl. No	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1											
2											
3											
4											
5											
6											
Total Score											

Note: Use separate sheet for each year



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program MS ENT

(Revised with effect from 2019-2020 onwards)

Goal

The Master's course in Otorhinolaryngology is a three year integrated course after satisfactory completion of which the candidate shall be able to practice Otorhinolaryngology competently and safely in the community that he/she serves.

Objectives of the course

1. A candidate is expected to have a detailed knowledge of all common and rare ear, nose, throat, and head and neck diseases. This includes various investigations; both invasive and non-invasive, recent developments in radiology like CT scan, MRI, CT guided FNAC and other relevant investigations, including all the routine investigations in arriving at a diagnosis. Operative surgery knowledge in detail of all the conditions and various complications of ward patients should be known.
2. Clinical training includes management of the various emergencies in ENT, out patient management of routine cases and day-to-day management of ward patients.
3. Various Endoscopic procedures, their indications and complications are to be known.
4. A knowledge of skull base surgery and combined craniofacial resection and the basics of all neuro – surgical interventions related to ENT.
5. They should be at par with the knowledge of recent advances in the field of ENT and Head & Neck surgery.
6. Basic knowledge of Plastic surgery in relation to ENT, which includes the different skin graft and the various flaps.
7. It is essential to know how to collect data to publish an article and it is ideal to have at least one publication during their 3 years of training.
8. Active participation in under- graduate training both theory and practicals, is essential.
9. They are expected to know the principles of speech therapy, audiological testing and management of hearing impairment.
10. Training in allied specialties like Oromaxillofacial Surgery, Neurosurgery, Plastic Surgery, Thoracic Surgery, anaesthesiology and General Surgery is desirable. The total training in allied specialties should not exceed 3 months in the whole course.

Program Outcomes

PO1 Offer to the community, the current quality of 'standard of care' in ENT diagnosis as well as therapeutics, medical or surgical, for common as well as referred conditions.

PO2 Utilize the knowledge and skills acquired in allied specialties such as Pathology, Microbiology, neuromedicine, Ophthalmology.

PO3 Undertake ear, nose and throat disease diagnostic responsibilities and participate in the management processes

PO4 Keeping abreast of all recent developments and emerging trends in the field of ENT

PO5 Evaluate own professional activities, educational needs and select appropriate learning resources periodically.

- PO6 Utilize the knowledge and skills acquired from various subspecialties like Voice clinic, Snoring clinic, Dysphagia clinic and Sialology clinic.
- PO7 Be aware of the indications for referral.
- PO8 Contribute as an individual/ or in a group or institution towards the fulfillment of national objectives concerning the prevention of deafness.
- PO9 Effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.
- PO10 Effectively communicate with colleagues.

Program Specific Outcomes

- PSO1 Ability to manage common ENT emergencies at primary level.
- PSO2 Perform daily Out patient services including patient screening and disease determination.
- PSO3 Perform OPD investigative tests like tuning fork test, diagnostic nasal endoscopy and indirect laryngoscopy.
- PSO4 Ability to perform basic OPD procedures such as foreign body removal, wax removal, ear lobe repair, suturing etc.
- PSO5 Ability to perform surgical procedures (independently/or as assistant) such as tonsillectomy, tympanoplasty, mastoidectomy, endoscopic sinus surgery etc.
- PSO6 Participate in community out reach activities like camps, school screening and public education.
- PSO7 Prescribe medications for various ailments and follow up patients to understand outcomes.
- PSO8 Present academic papers in State/National conference.
- PSO9 To do thesis work in the field of ENT under guidance of senior faculty.
- PSO10 Teach junior post graduates & undergraduates
- PSO11 To participate in department research activities and clinical audit.

Tentative schedule for training

Course Contents.

Essential Theoretical Knowledge.

BASIC SCIENCES

Anatomy:

Embryogenesis of ear, nose and throat including palate larynx, Esophagus, trachea, lungs, tongue, salivary gland, Head, Neck & Skull base etc. Parapharyngeal spaces in the neck including connective tissue barriers of larynx. Applied anatomy of the skull bones, accessory sinus, external, middle and inner ears, nose, PNS, nasopharynx, meninges, brain, pharynx, larynx, trachea and bronchi, lungs, pleurae, esophagus, and the mediastinum. Anatomy of all cranial nerves with their functions.

Physiology:

Mechanism of perception of smell and taste, mechanism of breathing and voice production, deglutition and salivation. Functions of the nose and Para sinuses, Mechanism of cough and sneezing. Physics of sound, theories of hearing, mechanism of perception of sound, speech Production, Physiology of equilibrium. Physiology of brain in connection with hearing, speech smell and phonation. Audiologic tests like Audiometry, impedance, evoked potentials, Oto Accustic Emissions, Speech audiometry Physiology of larynx, tracheobronchial tree & oesophagus. Histology of mucous membranes, internal ear and other associated organs and structures, nose Para

Nasal Sinuses, Nasopharynx, Tracheo Bronchial tree, Lymphoepithelial system.
Mechanism of immune system/immunology and genetics.

Clinical

- ☐ Clinical methodology as applied to Otorhinolaryngology and Head & Neck disease in adult & children and the accessory sinuses, diagnosis and surgical treatment of diseases of nose, throat and ear in adult and children. Prevention and treatment, infectious diseases of Otolaryngology and Head & Neck region. Circulatory and nervous disturbances of the nose, throat and ear and their effects on other organs of body. Deformities, injuries, sinus infections, polyps and the tumors of the nose, and paranasal sinuses. Examination of ear, deafness and allied diseases & complications of diseases of the ear. Injuries, tumors, circulatory & neuro-otological disturbances of the ear. Diagnosis & treatment of tinnitus and vertigo. Diagnosis and rehabilitation of the Hearing handicapped including, dispensing of hearing aid other vibrotactile aids.
- ☐ Surgical pathology of Otolaryngology and Head & Neck region.
- ☐ Basic knowledge of anesthesia as related to ENT.
- ☐ Examination of diseases in children (Pediatrics ORL) in connection with throat and larynx. Neurological & vascular disturbances. Congenital & neonatal stridor.
- ☐ Pathology of various diseases of larynx and throat, tracheo-bronchial tree and their causative organisms.
- ☐ Indications & various techniques of direct laryngoscopy, nasal endoscopy, bronchoscopy and oesophagoscopy (Including microlaryngoscopic procedures)
- ☐ Reading of radiograms, scans, audiograms, nystagmograms and tympanograms in connection with ENT diseases/disorders.
- ☐ The recent developments in the diagnosis, pathogenesis and treatments of the ENT diseases.
- ☐ The knowledge of frontiers of the oto-laryngology and lateral skull base surgery.
- ☐ Rhinoplasties, endoscopic sinus surgery, and anterior cranial fossa surgery.
- ☐ Knowledge of LASERS and fibre optics.
- ☐ Phonosurgery
- ☐ Etiology and Managements of sleep apnoea/snoring.
- ☐ Hypophysectomies and optic nerve decompressions.

- Immunotherapy and modalities of the gene therapy.
- Newer technique for Radiotherapy including, use of gamma knife for treatment of intracranial tumours and other malignancy & Chemotherapy of Head & Neck cancer.
- General surgery, Head & Neck oncology, and Medicine as applicable to the ENT disorders/diseases. Surgery of congenital deformities of nose, ear (Pinna) & Trachea/oesophagus etc.
- Radiology, Imaging, computed tomography and magnetic resonance imaging, (MRI) and interventional radiology and angiography as related to E.N.T.
- General pathologic aspects as wound healing, Pathology and Pathogenesis of ENT diseases, Pharmacology, molecular biology, genetics, cytology, hematology, and immunology as applicable to otolaryngology.
- General principles of faciomaxillary traumatology and also neck injury, plastic surgery as applicable to Otolaryngology.
- Basic computers, computer averaging of the biological signals and its applications in Otolaryngology & Otolaryngologic equipments.

AUDIOLOGIC AND SPEECH DISORDERS-MANAGEMENT STRATEGIES.

- Sound wave and their characteristics, Sound measurement
- AUDIOLOGICAL TESTS: Brief description about audiometers and its accessories, **Pure Tone Audiometry**; Principle, Procedure and interpretation of audiograms using audiometric symbols, Masking; Principle and procedure, Audiometric configurations for different pathologies, Speech Audiometry, Special test to differentially diagnose RCP and CP
- AUDIOLOGICAL TEST FOR PAEDIATRIC POPULATION: BOA, VRA
- IMPEDANCE AUDIOMETRY AND REFLEXOMETRY: Principle, procedure and classification of tympanograms, tympanograms in various pathologies
- OTO ACOUSTIC EMISSIONS: Principle, Types and its interpretation
- BRAINSTEM EVOKED RESPONSE AUDIOMETRY: Differential diagnosis of pathologies using BERA
- EVALUATION OF A DEAF CHILD: A test Battery Approach
- AUDIOLOGICAL REHABILITATION: Hearing Aids- Of deaf child and elderly population, Cochlear implants, Bone anchored hearing aids

- AN OVERVIEW OF THERAPUTIC INTERVENTION FOR SPEECH AND LANGUAGE DISODERS.

ESSENTIAL DIAGNOSTIC SKILLS

- 1) Proper history taking, clinical examination pertaining to ENT.
- 2) Diagnostic nasal endoscopy.
- 3) Flexible nasopharyngoscopy.
- 4) Otomicroscopy.
- 5) Indirect laryngoscopy.
- 6) Direct laryngoscopy
- 7) Audiological evaluation incl. PTA, Impedance audiometry, BERA, caloric test.
- 8) Radiological interpretation – Xray, CT, MRI.

ESSENTIALSURGICAL SKILLS

Clinical Procedures, which the candidate must know

PROCEDURE NAME	NO: PROCEDURE		
	AS OBSERVER	AS FIRST ASSISTANT	INDEPENDENTLY UNDER SUPERVISION
TRACHEOSTOMY	5	5	5
ADENOIDECTOMY	10	10	10
TONSILLECTOMY	10	10	10
INCISION DRAINAGE QUINCY/ OTHER ABCESES	2	2	10
BIOPSY FROM NECK MASS AND OTHER LYMPH NODE	2	2	10
DIRECT LARYNGOSCOPY	1	1	10
SUB MANDIBULAR DUCT STONE REMOVAL	1	NIL	NIL
TOTAL LARYNGECTOMY	2	NIL	NIL
RADICAL NECK DISSECTION	1	NIL	NIL
NASOPHARYNGEAL ANGIOFIBROMA	1	NIL	NIL
LIGATION EXTERNAL CAROTID ARTERY	2	1	NIL
MICOLARYNGEAL SURGERY	3	3	3
PARAPHARYNGEAL SPACE SURGERY	2	1	NIL
THYROID SURGERY	2	1	NIL
PREAURICULAR SINUS EXCISION	2	2	2
CORTICAL MASTOIDECTOMY/MODIFIED RADICAL MASTOIDECTOMY	5	5	5

MYRINGOTOMY	5	NIL	5
AURAL POLYPECTOMY	2	2	5
BRANCHIAL SINUSES/ THYROGLOSSAL CYST	2	2	2
FACIAL NERVE DECOMPRESSION	1	NIL	NIL
STAPEDECTOMY	5	NIL	NIL
MYRINGOPLASTY / TYMPANOPLASTY	5	5	5
NASAL POLYPECTOMY	5	5	5
SMR/ SEPTOPLASTY	5	5	10
EXTERNAL FRONTOETHMOIDECTOMY	1	NIL	NIL
FUNCTIONAL ENDOSCOPIC SINUS SURGERY	5	5	5
MAXILLECTOMY	1	NIL	NIL
RHINOPLASTY	10	10	NIL
LOBULOPLASTY	5	5	10
FRACTURE NASAL BONE	5	5	5
PAROTIDECTOMY	5	1	NIL

Thesis

Essential Research Skills.

Research methodology/Reporting on research

- ☐ Learns the basics in research methodology, and makes the thesis
- ☐ Problem oriented record keeping including use of computer
- ☐ Use of Medical literature search including through Internet use in the Library.
- ☐ Attends bio-statistics classes by arrangement.

Research Report

- ☐ Writing including preparation of Protocol for Research/Thesis.
- ☐ Writing an abstract/short paper/presentation style (Slide-making audiovisual aids).
- ☐ Preparation of a report on a research project, Thesis.

Rule for submission of thesis / Dissertation by candidates

1. The protocol of thesis / Dissertation should be submitted to the University through the head of the department within three (3) months of joining in Medical college.
2. If thesis is rejected or needs to be modified for acceptance, the thesis will be returned to the candidate with suggestion of assessors in writing for modification. The result of such candidate will be kept pending till the thesis is modified or rewritten, accordingly as the case may be and accepted by the examiner.

3. If any unethical practice is detected in work the of thesis, the same is liable to be rejected. Such candidates are also liable to be rejected. Such candidates are also liable to face disciplinary action as may be decided by the university.
4. The thesis is to be submitted 6 months before the commencement of the final examination.

Guidelines for writing of Thesis / Dissertation.

Title

Should be brief, clear and focus on the relevance of the topic

Introduction

Should state the purpose of study; mention lacunae in current knowledge and enunciating the Hypothesis.

Review of Literature

Should be relevant, complete and current to date.

Material and Methods

Should include the type of study (prospective, retrospective, controlled double blind) details of material and experimental design procedure used for data collection and statistical methods employed; statement of limitations ethical issues involved.

Observations

Should be organized in readily identifiable sections. Having correct analysis of data be presented in appropriate charts, tables, graphs and diagrams etc. Thesis should high be statistically interpreted.

Discussion

Observations of the study should be discussed and compared with other research studies. The discussion should highlight original findings and should also include suggestions for future.

Summary and conclusion

Bibliography

Should be correctly arranged in Vancouver pattern.

Appendix

All tools used for data collection such as questionnaire, interview schedules, observation checklists etc should be put in the annexure.

Methods of Training

Year wise structured training schedule

First year:

1. Theoretical knowledge

- a. Basic sciences should be addressed

- b. It is useful to have an internal examination of the basic sciences at the end of first year
- c. Clinical Otorhinology.

2. Clinical examination and diagnosis

- a. The basics of history taking, order and correct method of examination and recording have to be learnt during this time.
- b. Clinical and surgical decision making is encouraged under supervision

3. Skills

- a. All basic procedures as far as possible to be done under guidance and the Student should be fairly conversant with most of the diagnostic modalities.

Second year:

1. Theoretical knowledge

- a. Here stress will be laid on clinical laryngology and head and neck surgery.

2. Clinical examination and diagnosis

- a. The student is encouraged to take diagnostic investigational and therapeutic decisions on his / own. He / she should be able to manage most of the common problems that arise without guidance. However, the degree of freedom allowed in decision making is left to the confidence of the teacher in the student's abilities. It is to be encouraged. May require guidance for more complex cases.

3. Diagnostics

- a. The student should be conversant and at ease with most if not all of the diagnostic Procedures. Some procedures are optional skills if facility is available in the Department

4. Surgical Skills

- a. At the end of second year, the student should be capable for operating, without assistance, but under supervision, all varieties of basic surgeries.
- b. In addition, the master's candidate should ideally have assisted in other complex surgeries.

5. Conference and workshops

- a. The candidate should have attended one or two regional workshop and one national conference if possible. Presentation of a free paper at these venues is to be encouraged.

Third year:

1. Theoretical knowledge

- a. Should be thorough with basic clinical otorhinolaryngology with extensive and intensive reading.

2. Clinical examination and diagnosis

- a. Should be conversant with all aspects of clinical examination and decision-making. Investigation and management freedom should be

given at this for the usual situations. However, complex cases could be with consultant and degree of freedom of decision-making is left to consultant's discretion.

3. Skills

- a. Routine skills are honed during this period.
- b. Basic ENT surgeries should be done independently without supervisors or assistance
- c. Can assist other complex procedures. The choice of doing the surgery with assistance and supervision should be left to the discretion of the consultant.

4. Conference and workshops

- a. The candidate by this time should have attended at least one national conference. He/ she should be given time off to attend regional workshop and conferences particularly those dealing with the state of art.

Rotation and Posting in other departments

For an MS student, optional rotation posting to allied departments would include

Plastic surgery
Neurosurgery
Head and Neck surgery
CVTS

However, posting to these allied specialities would depend upon the head of Department's discretion. The total duration of posting should not exceed months.

Teaching and Learning Activities

The following learning methods may be used for the teaching:

1. Journal clubs: 1 hr duration. Paper presentation/discussion-once per Week
2. Seminars: One seminar every week of one-hour duration.
3. Lecture/discussions: Lectures on newer topics by Faculty, in place of seminar/as per need.
4. Case presentation in the ward and the afternoon Special clinics (such as vertigo / otology and Tumors clinics)-Candidates will present a clinical case for discussion before a faculty and discussion made pertaining to its management and decision to be recorded in case files.
5. Surgicopathological Conference: Special emphasis is made on the surgical pathology and the radiological aspect of the case in the pathology dept.
6. Combined Round/Grand Round: These exercises are to be done for the hospital once/wk. or twice/month involving presentation of unusual or difficult patients. Presentations of cases in clinical combined Round and a clinical series/research data on clinical materials for benefit of all clinicians/Pathologists/other related disciplines once in week or fortnightly in Grand round.

7. Community camps: For rural exposure and also for experience in preventive aspect in Rural situation/hospital and school. Patient care camps are to be arranged during 2-3 years, involving Candidates/junior faculty.

Courses

Paper - I Basic Medical Sciences Pertaining to ENT and Principles of General Surgery (Course U19MSEN01)

CO1: Knowledge of the anatomy of Ear, Nose and Throat.

CO2: Knowledge of the physiology of Ear, Nose and Throat.

CO3: Knowledge about the Microbiology and Pharmacology relevant to ENT.

CO4: Knowledge of general surgical principles relevant to ENT.

BASIC SCIENCES

Anatomy:

Embryogenesis of ear, nose and throat including palate larynx, Esophagus, trachea, lungs, tongue, salivary gland, Head, Neck & Skull base etc. Parapharyngeal spaces in the neck including connective tissue barriers of larynx. **Applied anatomy of the skull bones, accessory sinus, external, middle and inner ears, nose, PNS, nasopharynx, meninges, brain, pharynx, larynx, trachea and bronchi, lungs, pleurae, esophagus, and the mediastinum. Anatomy of all cranial nerves with their functions.**

Physiology:

Mechanism of perception of smell and taste, mechanism of breathing and voice production, deglutition and salivation. Functions of the nose and Para sinuses, **Mechanism of cough and sneezing. Physics of sound, theories of hearing, mechanism of perception of sound, speech Production, Physiology of equilibrium.** Physiology of brain in connection with hearing, speech smell and phonation. Audiologic tests like Audiometry, impedance, evoked potentials, Oto Acoustic Emissions, Speech audiometry Physiology of larynx, tracheobronchial tree & oesophagus. Histology of mucous membranes, internal ear and other associated organs and structures, nose Para Nasal Sinuses, Nasopharynx, Tracheo Bronchial tree, Lymphoepithelial system. Mechanism of immune system/immunology and genetics.

Clinical

- ☐ Clinical methodology as applied to Otorhinolaryngology and Head & Neck disease in adult & children and the accessory sinuses, diagnosis and surgical treatment of diseases of nose, throat and ear in adult and children. Prevention and treatment, infectious diseases of Otolaryngology and Head & Neck region. Circulatory and nervous disturbances of the nose, throat and ear and their effects on other organs of body. Deformities, injuries, sinus infections, polyps and the tumors of the nose, and paranasal sinuses. Examination of ear, deafness and allied diseases & complications of diseases of the ear. Injuries, tumors, circulatory & neuro-otological disturbances of the ear. Diagnosis & treatment of tinnitus and vertigo. Diagnosis and rehabilitation of the Hearing handicapped including, dispensing of hearing aid other vibrotactile aids.
- ☐ **Surgical pathology of Otolaryngology and Head & Neck region.**

- ☐ Basic knowledge of anesthesia as related to ENT.
- ☐ Examination of diseases in children (Pediatrics ORL) in connection with throat and larynx. Neurological & vascular disturbances. Congenital & neonatal stridor.
- ☐ Pathology of various diseases of larynx and throat, tracheo-bronchial tree and their causative organisms.
- ☐ **Indications & various techniques of direct laryngoscopy, nasal endoscopy, bronchoscopy and oesophagoscopy** (Including microlaryngoscopic procedures)
- ☐ Reading of radiograms, scans, audiograms, nystagmograms and tympanograms in connection with ENT diseases/disorders.
- ☐ General surgery, Head & Neck oncology, and Medicine as applicable to the ENT disorders/diseases. Surgery of congenital deformities of nose, ear (Pinna) & Trachea/oesophagus etc.
- ☐ Radiology, Imaging, computed tomography and magnetic resonance imaging, (MRI) and interventional radiology and angiography as related to E.N.T.
- ☐ General pathologic aspects as wound healing, Pathology and Pathogenesis of ENT diseases, Pharmacology, molecular biology, genetics, cytology, hematology, and immunology as applicable to otolaryngology.
- ☐ General principles of faciomaxillary traumatology and also neck injury, plastic surgery as applicable to Otolaryngology.
- ☐ Basic computers, computer averaging of the biological signals and its applications in Otolaryngology & Otolaryngologic equipments.

Paper - II Diseases of EAR, Audiology & Speech Therapy (Course U19MSEN02)

CO1: Detailed knowledge of common diseases affecting the ear.

CO2: Knowledge and skill in use of otoscope and tuning fork tests.

CO3: Ability to diagnose and manage (including surgical management) common ear conditions.

CO4: Knowledge of instruments used for audiometry.

CO5: Competency in performing basic audiometric test.

CO6: Competency in managing cases of foreign body.

AUDIOLOGIC AND SPEECH DISORDERS-MANAGEMENT STRATEGIES.

- ☐ Sound wave and their characteristics, Sound measurement

- ☐ **AUDIOLOGICAL TESTS: Brief description about audiometers and its accessories, Pure Tone Audiometry;** Principle, Procedure and interpretation of audiograms using audiometric symbols, Masking; Principle and procedure, Audiometric configurations for different pathologies, Speech Audiometry, Special test to differentially diagnose RCP and CP
- ☐ PTA in pediatric age group
- ☐ AUDIOLOGICAL TEST FOR PAEDIATRIC POPULATION: BOA, VRA
- ☐ IMPEDANCE AUDIOMETRY AND REFLEXOMETRY: Principle, procedure and classification of tympanograms, tympanograms in various pathologies
- OTO ACOUSTIC EMISSIONS: Principle, Types and its interpretation
- ☐ BRAINSTEM EVOKED RESPONSE AUDIOMETRY: Differential diagnosis of pathologies using BERA
- ☐ Cortical Evoked Response Audiometry (CERA)
- ☐ **EVALUATION OF A DEAF CHILD:** A test Battery Approach
- ☐ AUDIOLOGICAL REHABILITATION: Hearing Aids- Of deaf child and elderly population, Cochlear implants, Bone anchored hearing aids
- ☐ Trans sphenoidal approach in neurosurgery
- ☐ **AN OVERVIEW OF THERAPUTIC INTERVENTION FOR SPEECH AND LANGUAGE DISORDERS.**

Paper - III Diseases of Throat and Head and Neck (Course U19MSEN03)

CO1: Detailed knowledge of common diseases affecting the throat, head and neck.

CO2: Competency in the medical and surgical management of tonsillitis.

CO3: Ability to diagnose and manage (including surgical management) common throat, head & neck conditions.

CO4: Knowledge of the evaluation of hoarseness

CO5: Competency in managing cases of foreign body.

- 1) **Proper history taking, clinical examination pertaining to ENT.**
- 2) **Diagnostic nasal endoscopy.**
- 3) **Flexible nasopharyngoscopy.**
- 4) Otomicroscopy.
- 5) Indirect laryngoscopy.
- 6) Direct laryngoscopy
- 7) Audiological evaluation incl. PTA, Impedance audiometry, BERA, caloric test.
- 8) **Radiological interpretation – Xray, CT, MRI.**

Paper - IV Recent Advances in Otorhinolaryngology, Medicine and Surgery as Applied to ENT and Diseases of Nose (Course U19MSEN04)

CO1: Knowledge of diagnosis and management of all nasal conditions.

CO2: Competency in managing cases of foreign body.

CO3: Updated knowledge of technologies and instrumentations used in ENT.

CO4: Knowledge about the recent published research papers in ENT.

The recent developments in the diagnosis, pathogenesis and treatments of the ENT diseases.

- ☐ The knowledge of frontiers of the oto-laryngology and lateral skull base surgery.
- ☐ Recent advances in the treatment of acute onset deafness
- ☐ Rhinoplasties, endoscopic sinus surgery, and anterior cranial fossa surgery.
- ☐ Liaising with Oral and Maxillofacial surgery colleagues in required cases
- ☐ **Knowledge of LASERS and fibre optics.**
- ☐ Knowledge of recent advances in MicroLaryngeal Surgeries
- ☐ Phonosurgery
- ☐ Hypophysectomies and optic nerve decompressions.
- ☐ **Immunotherapy and modalities of the gene therapy.**
- ☐ **Newer technique for Radiotherapy including, use of gamma knife for treatment of intracranial tumours and other malignancy & Chemotherapy of Head & Neck cancer.**

Soft Skills (Elective Course)

CO1: Competency to conduct a clinical research.

CO2: Acquisition of pedagogical skills for students (MBBS, BSc Audiology)

CO3: Ability to work as a member of a healthcare team.

CO4: Communication skills with patients, caregivers and colleagues including non medical staff.

CO5: Attitude to be a lifelong learner.

Scheme of examination

Theory

Theory examination constitute 4 papers, each paper is of 100 marks.

Paper 1 Basic Sciences

Paper II Otology and Audiology

Paper III Laryngology, Voice, Speech and swallowing and Head and Neck

Division of Questions

Each question to be of a total of 10 marks, of structured nature. Subdivision and respective marks to be indicated clearly. 20 marks based on clinical scenarios. This can be a single question/scenario or two separate scenarios. Accordingly the total number of questions would be 9 or 10. The prepared question papers are intended as a model for the examiners. Individual variations within the guidelines set above can be made.

Practical examination

Only long case of importance to be given for history taking, approach to the patient, clinical examination, diagnosis and management.

Three short cases: One from each system not covered by the long cases. Here importance is given for the clinical examination, findings, diagnosis and management of each case. Total marks 200.

Viva Voce:

X- rays, CT scan, MRI

Surgical instruments

Surgical specimens

Microscopic slides covering microbiology and pathology

Osteology

Audiology and Speech pathology

Operative surgery

Marks are to be distributed according to the content of the particular portion.

Total marks 100.

Log Book

The day today work, attendance, participation in seminar, case discussion, joined clubs, surgeries performed, assisted, observed,

Attendance of clinical workshop, CME programmes, conferences, medical camps, CPC's, and other academic programmes are to be entered. The log book should be submitted to Assistant professors of the concerned unit and got signed every month. The unit chief should sign the logbook once the posting in that unit is over.

Thesis- Dissertation

It is essential to know how to collect data, compile it, and publish it. Hence thesis – dissertation in a relevant topic pertaining to otorhinolaryngology and head and neck surgery to be submitted to the University at least 3 months before the theory examination. The University may send it for evaluation well in advance of final examination.

MAXIMUM MARKS FOR UNIVERSITY EXAMINATION

THEORY	PRACTICAL	VIVA VOCE
400	200	100

DISTRIBUTION OF MARKS FOR THE UNIVERSITY EXAM

THEORY-400	PRACTICAL-200		VIVA VOCE-100						
		SHORT CASES Or OSCE							LOG BOOK & THE SIS
	LONG CASES		RADIOLOGY	INSTRUMENTS	SPECIMENS	SLIDES (MICRO+PATHOLOGY)	AUDIOLOGY & SPEECH PATHOLGY	OPERATIVE SURGERY	
4 X 100=400	100	35+35+30	15	15	15	10	15	15	15

10

A candidate securing separate minimum of 50% in theory and practical are eligible to pass the examination. Those securing 70% and above are eligible to pass with distinction.

Model Question Paper

Paper I

BASIC SCIENCES

100 Marks / 3 hours

1 clinical scenario question of 20 marks

8 questions of 10 marks each, all of a structured nature.

Please answer according to the assigned marks for each sub-question.

Please draw suitable diagrams wherever necessary.

- 34/F presented with history of vertigo. Clinical features were suggestive of benign paroxysmal positional vertigo (BPPV).
Describe the anatomical and physiological basis of the positional tests for the different types of BPPV. (4)
Outline the pathway of the vestibule-ocular reflex (VOR). (2)
Describe the central connections of the vestibular nuclei(5)
Detail the specific eye movements cause dby stimulation of each SCC. (6)
List the three visually controlled oculomotor systems apart from VOR .(3)
- Explain, with diagrams, the anatomical basis of the Fisch Type A approach for the excision of glomus jugulare tumour. (10)
- Describe the structure and functions of the hair cells of the cochlea .(6+4)
- List the functions of the nose. (3)
Discuss the 'Nasal cycle' in detail. (4)
Principles of Rhinomanometry. (3)
- Classify muscles of larynx. (2)

- Describe, in detail, attachments of all the intrinsic muscles of the larynx. (4)
Explain the concept of 'Body – Cover' of the vocal folds.(4)
6. Describe the anatomy of nerves encountered during a total parotidectomy. (8)
Add a note on the Otic ganglion. (2)
 7. Local anesthesia (LA):
Attributes and Qualities of the ideal LA agent? (4)
Actions and Dosages of Lignocaine. (2)
Technique of laryngeal LA for an office procedure on the vocal cords. (2)
Diagram to show points of LA infiltration for a Myringoplasty. (2)
 8. Classify Flaps used for reconstruction. (2)
Discuss the use of different types of free flaps in ENT. (6)
Add a note on the pectoralis major myo – cutaneous flap. (2)
 9. Describe the classification of chemotherapeutic agents with 1 example each. (8)
List the four chemotherapy strategies in head and neck cancer. (2)

Paper II

OTOLOGY and AUDIOLOGY

100 marks / 3 hours

1 Clinical scenario question of 20 marks

8 questions of 10 marks each; all of a structured nature.

Please answer according to the assigned marks for each sub – questions.

1. A 45/ M presents in Casualty following a road traffic accident, with h/o blow to his right frontal region. ENT opinion sought for bleeding noticed from the right ear.

What are the relevant clinical features to check from an otologic aspect? (4)

After initial head injury management, patient is transferred under ENT for further care for his symptoms of watery discharge from the right ear and facial asymmetry.

Give a detailed, step-wise protocol of management (4)

Right –sided LMN facial palsy persists on the 10th day.

What is the ideal electric- physiological test at this stage? (1)

Which are the different electrical tests in cases of facial nerve palsy? (2)

Describe the House- Brackmann classification used in these cases. (3)

What are the indications for facial nerve decompression in such a case? (1)

Detail the principles of facial nerve repair, intra-operatively. (3)

Name two methods of facial re-animation, in case of unresolved facial palsy. (2)

2. Define Otosclerosis and name the four common areas of its occurrence. (1+4)
Describe the genetic pattern of its inheritance. (2)
What is the mechanism of Carhart's notch? (2)
What are the contraindications for surgery in Otosclerosis (3)
3. Tinnitus: List the classification and pathology of its causes. (4)
What are its new theories of mechanisms? (4)
Pharmacotherapy of tinnitus : Name four groups of drugs used. (2)
4. Congenital ear anomalies:
Define Protruding ear (1)
Discuss two commonly used corrective procedures for the protruding ear. (4)
Principles of surgery of Anotia (4)
5. Vestibular Schwannoma (VS): Describe the clinico - pathological stages. (3)
What are its effects on the inner ear? (2)
Describe the possible eye findings in a case of progressive VS. (3)
Discuss the advantages and disadvantages of the Trans-labyrinthine approach. (2)
6. Meniere's disease (MD):
Mention four (cochlear) pathologic features. (2)
What are its theories causation? (2)
Modalities of intra - tympanic Gentamicin injection in MD. (2)
Principles and types of surgeries for MD. (4)
7. Vestibular rehabilitation:
What is meant by Static and dynamic symptoms in vestibular dysfunction? (2)
What are the mechanisms of vestibular compensation? (6)
Describe the Pharmacologic actions of Betahistine? (2)
8. Hearing aids (HA):
Classify and name types Has. (2)
Define 'Gain' and 'Peak clipping in Has. (2)
Principles of selection and prescription of Has. (3)
Detail the problems faced by the HA – user .(3)
9. Describe the hearing tests for Malingering. 94)
Principles of SISI and TDT. (4)
Name four behavioural tests to detect central auditory deafness. (2)

Paper III

LARYNGOLOGY, VOICE, SPEECH and SWALLOWING, HEAD and NECK

100 marks / 3 hours

1 Clinical scenario question of 20 marks
8 questions of 10 marks each; all of a structured nature.

Please answer according to the assigned marks for each sub – questions.

1. 47/F with gradually progressive neck swelling, diagnosed on USG as arising in the thyroid gland. FNAC reported as suspicious of malignancy.

WHO revised histological classification of malignant thyroid tumours? (2)

What are further relevant investigations prior to surgery? (2)

Total thyroidectomy was done for this lady.

Surgical anatomic classification of recurrent and superior laryngeal nerves? (2)

Post – operative pt. reports hoarseness. ILS shows right vocal cord immobile in lateral position.

Detail the voice assessment methods (4)

What are the principles of management in this case? (2)

9 months post –op- no improvement in voice and findings – decision for surgery.

What are the surgical options? (1)

Classify Isshiki's Thyroplasty with one indication for each. (4)

Indications for arytenoids adduction / rotation procedure?(2)

2. In a case of intractable aspiration, what are the relevant investigations? (2)
Describe the surgical options with their indications. (8)

3. Obstructive sleep apnoea (OSA):

How is the severity graded? (2)

Describe the diagnostic modalities with their underlying principles. (6)

What are the indications for surgery in this condition? (2)

4. laryngeal trauma:

Discuss the biomechanics of different types of laryngeal injury. (4)

Schaefer classifications. (2)

Add a note on laryngeal stents. (4)

5. Branchial cysts:

Briefly describe their theories of origin. (4)

What are the clinical features?(2)

Management? (4)

6. Sjogren's disease:

List the salivary glands –related criteria in the revised international classification.(4)

List four exclusion criteria. (2)

What are the oral and salivary manifestations? (2)

Name four therapeutic agents. 92)

7. Give the TNM classification of metastatic neck nodes. (2)
What is the investigation protocol for met. nodes with unknown primary. (2)
What are the management options in a pt. with met. neck nodes?(4)
Mention the principles of positron emission tomography (PET). (2)
8. Describe the radiological appearance of four common jaw cysts. (4)
Discuss Odontogenic tumours of the mandible. (6)
9. Give the 4 point gradation of chronic laryngitis. (2)
Discuss the clinical features and management of laryngo-pharyngeal reflux (LPR). (6)
What are the possible findings in laryngeal tuberculosis. (2)

PAPER IV

RHINOLOGY and RECENT ADVANCES

100 marks / 3 hours

1 Clinical scenario question of 20 marks

8 questions of 10 marks each; all of a structured nature.

Please answer according to the assigned marks for each sub – questions.

1. 50/M presents with h/o progressive nasal block, with past h/o polypectomy many years prior. On enquiry, he has a history of allergy. He is presently diabetic, controlled with OHAs.
Anterior rhinoscopic examination shows polyps in both nostrils. Diagnostic nasal endoscopy is done.
Describe the Lund Mackay scoring system of the endoscopic findings. (2)
What are the newer concepts in the pathogenesis of allergic ethmoid polyps? (4)
List the medical management protocol for this patient. (2)
What are the prognostic indicators of successful outcome of surgery? (2)
2. 11/F presents with the symptom of bilateral proptosis, of recent onset but gradually progressive. On enquiry, she is non diabetic.
What is the most likely diagnosis? (1)
Other clinical features to check in this patient? (2)
CT PNS was done for her. Possible findings on CT? (2)
What are the indications for surgical intervention in this case? (2)
Discuss the possible surgical modalities? (3)
3. Discuss the types of endonasal frontal sinus drainage procedures . (6)
Indications and procedure of Balloon Sinusoplasty. (4)
4. Epsitaxis:
Describe the arterial supply of the nose. (4)

- Briefly describe the surgical modalities of management. (4)
Add a note on hereditary haemorrhagic telangiectasia (HHT). (2)
5. Rhinoplasty:
List the types of external nasal deformities (2)
What are the causes of a saddle – nose? (3)
Classify and list the graft materials used. (2)
Indications and advantages of an external approach. (3)
 6. Pituitary tumour, being planned for trans-nasal approach:
What are the relevant pre – operative investigations? (2)
Discuss the advantages and disadvantages of the various approaches. (6)
Add a note on navigation – guided surgery, in such cases. (2)
 7. Carcinoma Nasopharynx:
Genetic factors in its aetiology. (2)
Diagnostic tools in biopsy – negative cases. (2)
Principles of radiotherapy in these cases. (2)
List the anterior surgical approaches to the nasopharynx. (2)
Role of photo-dynamic therapy (PDT). (2)
 8. Explain the concepts of ‘Allergic march’ and ‘Unified airway’. (4)
Sub-lingual immunotherapy (SLIT) for allergy. (2)
Discuss the surgical modalities in a case of severe allergic rhinitis. (4)
 9. Sialendoscopy:
Discuss the advantages and disadvantages (4)
List the types of scopes (2)
Briefly describe the basic steps of procedure (2)
Four possible complications (2)
 10. Name four syndromic craniosynostoses. (2)
Management principles in these cases. (4)
List two surgical options. (2)
Add a note on Distraction Osteogenesis. (2)

Recommended Books

Must read

1. Scott Brown's Diseases of Ear Nose and Throat
2. Shambaugh Surgery of Ear
3. Rob and Smith Operative Surgery
4. Otolaryngology & Head Neck Surgery – Cummings
5. Montgomery's Surgery of the upper respiratory tract (Vol- 1&2)
6. Suen Myers Head and Neck Surgery
7. Stammberger's Functional Endoscopic Sinus surgery

List of books

Must refer

1. Stell and Maran Head and Neck Surgery
2. Mawson's Disease of the ear
3. Gray's Anatomy

4. Mirko Tos Middle ear surgery (Vol- 1,2& 3)

List of Journals**Indian**

1. Indian Journal of Otolaryngology and Head Neck Surgery
2. Asian Journal of Ear Nose and Throat
3. Indian Journal of Otology

Foreign

1. Journal of Laryngology and Otology
2. Otolaryngologic clinics of North America
3. Int. J. of Paediatric Otolaryngology
4. Laryngoscope
5. Otolaryngology Head Neck Surgery
6. Annals of otology, rhinology & laryngology

XXXXXXXXX



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program MS General Surgery

(Revised with effect from 2019-2020 onwards)

Goals

The goals of postgraduate training course in General Surgery would be to train a MBBS doctor who will:

Practice surgery efficiently and effectively, backed by a sound scientific knowledge and skill base.

Shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology;

Exercise empathy and a caring attitude and maintain high ethical standards.

Continue to evince keen interest in continuing surgical education

Be a motivated 'teacher' –to share his knowledge and skills with a colleague or a junior

Shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.

Objectives:

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the three year course. The Objectives may be considered under the subheadings.

Knowledge (Cognitive domain)

Skills (Psycho motor domain)

Human Values, Ethical practice and Communication skills.

Program Outcomes

PO1: Practice surgery efficiently and effectively, backed by a sound scientific knowledge and skill base.

PO2: Acquire a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology;

PO3: Exercise empathy and a caring attitude and maintain high ethical standards.

PO4: Continue to evince keen interest in continuing surgical education

PO5: Be a motivated 'teacher' –to share his knowledge and skills with a colleague or a junior

PO6: Shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy.

Program Specific Outcomes

PSO1: Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.

PSO2: Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion.

PSO3: Describe common malignancies and their management including prevention.

PSO4: Demonstrate understanding of basic sciences relevant to General Surgery.

PSO5: Recognize conditions that may be outside the area of his specialty / competence and to refer them to proper specialist.

PSO6: Update himself by self study and by attending courses, conferences and seminars relevant to surgery

PSO7: Teach and guide his team, colleagues and other students.

PSO8: Undertake audit and carry out research with the aim of publishing his work and presenting his work at various scientific fora.

PSO9: Take a proper clinical history, examine the patient, perform essential diagnostic procedures , order relevant tests and interpret the results to come to a reasonable diagnosis about the surgical condition.

PSO10: Perform minor operative procedures and common general surgical operations independently.

PSO11: Provide basic and advanced life saving support services (BLS & ALS) in emergency situations.

PSO12: Manage acute abdominal emergencies and poly trauma.

PSO13: Management of wounds including burn wounds.

PSO14: Preoperative and post operative care of the patient.

PSO15: Adopt ethical principles in all aspects of his surgical practice. Professional honesty and integrity are to be fostered. Surgical care is to delivered irrespective of the social status, caste, reed or religion of the patient.

PSO16: Develop communication skills and to obtain an informed consent from the patient.

PSO17: Provide leadership and get the best out of his team.

PSO18: Apply high moral and ethical standards while carrying out human or animal research.

PSO19: Accept the limitations of his knowledge and skill and to ask for help from colleagues when needed.

PSO20: Respect patients' rights and privileges

Components of the postgraduate curriculum:

The major components of the Postgraduate curriculum shall be :

Theoretical knowledge

Practical and clinical skills

Thesis skills.

Attitudes including communication skills.

Training in research methodology

Knowledge:

Objectives related to knowledge and higher cognitive abilities that are expected to be achieved during the course are given below.

At the end of training, the candidate must be able to:

Describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children.

Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion.
Describe common malignancies and their management including prevention.
Demonstrate understanding of basic sciences relevant to General Surgery.
Recognize conditions that may be outside the area of his specialty / competence and to refer them to proper specialist.
Update himself by self study and by attending courses, conferences and seminars relevant to surgery
Teach and guide his team, colleagues and other students.
Undertake audit and carry out research with the aim of publishing his work and presenting his work at various scientific fora.

Skills

Take a proper clinical history, examine the patient, perform essential diagnostic procedures , order relevant tests and interpret the results to come to a reasonable diagnosis about the surgical condition.
Perform minor operative procedures and common general surgical operations independently.
Provide basic and advanced life saving support services (BLS & ALS) in emergency situations.
Manage acute abdominal emergencies and poly trauma.
Management of wounds including burn wounds.
Monitoring patients
Preoperative and post operative care of the patient.

Human values, Ethical practice and communication skills

Adopt ethical principles in all aspects of his surgical practice. Professional honesty and integrity are to be fostered. Surgical care is to delivered irrespective of the social status, caste, reed or religion of the patient.
Develop communication skills and to obtain an informed consent from the patient.
Provide leadership and get the best out of his team.
Apply high moral and ethical standards while carrying out human or animal research.
Accept the limitations of his knowledge and skill and to ask for help from colleagues when needed.
Respect patients' rights and privileges

Essential Knowledge

General Surgery today mainly covers abdominal operations, thyroid and breast diseases. A General Surgeon should also have knowledge of some common problems in allied specialties. Furthermore, he should be familiar with complications, current controversies and recent advances in these topics.
The topics are considered under:
Basic sciences
General Surgery topics
Specialty topics.

Basic sciences include **anatomy, physiology, biochemistry, microbiology and pathology as found in current textbooks. The stress is on applied anatomy of areas dealt with by surgeons , pathophysiology and surgical pathology.**

General Surgery topics including the following

History of Surgery
Clinical history and examination - detailed systematic history taking, clinical examination of various systems, coming to a provisional working diagnosis.
Rationale of diagnostic tests - Ordering diagnostic test with prioritizing the needs, based on the clinical, hospital and the patient's socioeconomic conditions.
Informed consent / Medico legal cases - Understanding the implications of acts of omission and commission in practice. Issues regarding Consumer protection Act.- Implications in a medico- legal case like accidents assaults etc.
Communication skills with the patient - Understanding clarity in communication, compassionate explanations and giving emotional support to at the time of suffering and bereavement.
Principles of surgical audit - Understanding the audit process and outcome. Methods adopted for the same. Basic statistics to understand and critically evaluate published research paper
Principles of evidence based medicine - Understanding journal based literature study; the value of textbook, reference book articles; value of review articles; original articles and their critical assessment. Understanding the value of retrospective, prospective, randomized controlled and blinded studies.- Understanding the principles and meanings of various biostatistical tests applied In these studies
Medical ethics / Social responsibilities of surgeons
Use of computers in surgery
Health insurance, Health Care financing Few lectures or a seminar on basic understanding of pharmacoeconomics.
Undertaking clinical audit
Prospective data collection/ writing case reports and clinical papers
Giving presentation / Computer presentation
Preoperative work up - concept of fitness for surgery; basic medical workup; workup in special situation like diabetes, renal failure, cardiac and respiratory illness; risk stratification
Principles of operative surgery like asepsis, antisepsis, sterilization

Surgical sutures, drains, prosthetic grafts
Postoperative care- concept of recovery room care; airway management; management of cardio vascular instability in this period; pain management
Basic surgical instrumentation- Principles of surgical instrumentation; their maintenance and sterilization
Surgical diathermy, Lasers, Harmonic scalpel
Wound management- wound healing; factors influencing healing; basic surgical techniques; properties of suture materials
Assessment of head, chest and abdominal trauma and triage- Assessment of a trauma victim, ATLS resuscitation; care at the site; triage; care in the accident department; criteria for immediate surgery; immediate workup and logical referral criteria
Fluid electrolyte balance/Acid–Base metabolism- The body fluid compartments; metabolism of water and electrolytes; factors maintaining homeostasis; acidosis and alkalosis
Blood transfusion- Blood grouping; cross matching; blood component therapy; complications of blood transfusion; blood substitutes; auto transfusions; cell savers.
Surgical infections: - Asepsis , antisepsis; microbiological principles; rational use of antibiotics; special infections like synergistic gangrene and diabetic foot infections. Hepatitis and AIDS. Tetanus, gas gangrene.
Surgical nutrition- nutritional assessment; metabolic response to stress; need for nutritional support; enteral nutrition; routes of access to GI tract; parenteral nutrition; access to central veins for nutritional support.
Principles of Laparoscopy / GI endoscopy- Laparoscopic instrumentation; physiology of pneumoperitoneum; complications of laparoscopy; diagnostic and therapeutic applications. GI Endoscopic instrumentation; Diagnostic and therapeutic applications of upper GI, Lower GI and ERCP studies.
Principles of Oncology- cell kinetics; causation of tumours; principles of oncologic surgery, radiotherapy, and chemotherapy, paraneoplastic syndromes; cancer pain management; palliative care.
Principles of burn management – types of thermal injury; assessment of extent; immediate management; late management; skin cover; rehabilitation.
Principles of fracture management- fracture healing; principles of immobilization; complications; principles of internal fixation.
Airway obstruction / management- anatomy of the airway; principles of keeping the airway patent; oropharyngeal airway; Endotracheal intubation; crico-thyroidotomy; tracheostomy
Shock and pulmonary failure:- types of shock; diagnosis; resuscitation; pharmacological support; ARDS and its causes, prevention, ventilatory support; SIRS, MODS
Anaesthesia:- stages of anesthesia; pharmacology of inhalational, intravenous and regional anesthetics; muscle relaxants
Assessment of trauma; multiply injured patient/ closed abdominal and chest injuries / penetrating injuries; fractures pelvis; urological injuries; vascular injuries; trauma scores
Acute abdomen- appendicitis/ peritonitis / perforated viscus / intestinal obstruction
Hernias- various types of hernias; their repair; synthetic materials for hernioplasty.

Critical care- cardiorespiratory failure- management of shock; including monitoring; sepsis scores; pharmacological support
Pain control- acute and chronic pain; cancer and non cancer pain; patient controlled analgesia
Breast disease- benign and malignant disease; diagnosis; investigation; screening for cancer; genetics of breast cancer.
Thyroid disease – solitary nodule; investigation; Multinodular goiter; Hashimoto’s disease; Thyrotoxicosis; Thyroid cancer.
Upper GI disease – esophageal disease and gastro duodenal disorders.
Hepato- Biliary disease
Pancreatic disease
Colo rectal disease / anal disease
Soft tissue neoplasm
Endocrine disease
Organ transplantation- Transplant immunology; Brain death
Introduction to the non-linear mathematics - the theory of chaos

The specialty topics include the following:

GI endoscopy and Laparoscopy:

Principles of GI endoscopy
Complications including infective considerations
Diagnostic and therapeutic GI endoscopy including upper GI , lower GI and pancreato Biliary systems
Physiology of pneumoperitoneum
Diagnostic Laparoscopy
Laparoscopic therapeutic procedures

Neuro surgery

Head and neck trauma; acute management and rehabilitation
Concept of brain death/ medico legal implications
Peripheral nerve injuries
Neoplasms of the brain and meninges
Acute and chronic infections of brain and meninges
CSF circulation ,Hydrocephalus

Spinal injuries
Monitoring intracranial tension

Urology

Urological injuries
Urothelial tumours / Chemotherapy; urolithiasis
Prostatic hypertrophy
Hypospadias
Pyleonephritis / perinephric abscess
GU tuberculosis
Scrotal disease, Hydrocele; Testicular tumours
Endourology
Peritoneal dialysis/ CAPD / Haemodialysis
Transplantation/ harvesting kidney
Urinary diversion
Infertility / Vasectomy
Pyleoplasty / hydronephrosis

Oncology

Imaging-CT/ MRI
Breast thyroid and GI malignancies
Head and neck tumours. Neck dissection
Chemotherapy/ Adjuvant therapy
Post excision reconstruction
Radiotherapy

Plastic surgery

Burns management
Facial injuries
Principles of tissue transfer
Cleft lip and palate
Congenital defects of hand
Pressure sores
Principles of microsurgery

Hypospadias
Details of skin flap
Nerve repair
Vascular repair
Hand injuries/ tendon injury

Cardio- thoracic surgery

Flail chest/ thoracic trauma
Bronchogenic carcinoma
Endocarditis prophylaxis
Pulmonary function tests
Control of major haemorrhage
Operations on the diaphragm
Coronary artery disease
Valvular heart disease
Lobectomies and pneumonectomies
Oesophageal disease
Operations on thoracic aorta
Mediastinal tumours
Basics of congenital heart disease

Vascular surgery

Vascular imaging
A V malformation
Exposure of major arteries and veins/ vascular anastomosis
Varicose veins
Chronic venous insufficiency
Vascular emergencies – trauma, embolism
Peripheral vascular disease – Atherosclerosis, arteries- TAO
Details of vascular prosthesis

Paediatric surgery

Fluid and electrolyte management
Preparation for surgery / postop care
Hernias
Spinal fusion defects
Ventral defects

Undescended testis
Hypertrophic pyloric stenosis
Hirschsprung's disease
Diaphragmatic hernia
Tracheo oesophageal fistula
Anorectal anomalies
Necrotizing enteritis

Gynaecological surgery

Pelvic inflammatory disease
Ectopic pregnancy
Ovarian Cysts
Caesarean section
Family planning

Essential Surgical skills

Surgery is a skill-based discipline. The following list is drawn up with a view to specifying basic minimum skills to be acquired. While an attempt has been made to specify the year wise distribution of the learning of skills (in the latter part of curriculum), it is recognized that the process is a continuous one. The year wise distribution of the skills recommended are to be used as general guideline.

Provision of training in various specialty subjects has been made during the second year of the course. The list within the tables, indicates the surgical procedures that the students should, by the end of the course, be able to perform independently (PI) by himself / herself , performed with assistance (PA) ,observed (O) or have assisted the operating surgeon (A). Note, for all categories, the student washes up in the operating room. There may an overlap in the skill list between the General Surgery list and specialty list.

Skills may be considered under the following headings.

Basic skills
Ward procedures
ICU procedures
Emergency room procedures
Preoperative work up
Post operative care
Minor surgical procedures
Major operating room techniques
General surgical procedures

Specialty surgical procedures

Basic skills

The student should have acquired certain skills during his under-graduation and internship. These skills have to be reinforced at the beginning of the training period. These skills include:

Procedure	Category	Year	Number
Insertion of I.V.lines, nasogastric tubes, urinary catheters, etc	PI	1	75
Minor suturing and removal of sutures	PI	1	75
Removal of tubes and drains	PI	1	50
Routine wound dressing	PI	1	100

Ward procedures

Ward work forms an important part of the training of the training of the surgeons. In addition to the routine examination of the patient with proper recording of findings, diligent practice of the following is recommended.

Procedure	Category	Year	Number
Abdominal Paracentesis including diagnostic Peritoneal Lavage	PI	II,III	3
Ability to teach undergraduates and interns	PI	1	NA
Blood sampling – Venous and arterial	PI	1	NA
Bone marrow Aspiration	PI	1	2
Wound debridement	PI	II	10
Communication skills with patients, relatives, colleagues and paramedical staff	PI	1	NA
Ordering laboratory and Radiological investigations and interpretation of the report in light of the clinical picture.	PI	1	NA
Proficiency in common ward procedures	PI	1	NA
FNAC/Trucut biopsy	PI	1	10
Hand held Doppler for varicose veins/arterial disease	PI	1	10
Per-rectal examination and Proctoscopy	PI	1	NA
Thoracocentesis, Tube thoracostomy	PI	II	5
Universal precautions against communicable diseases	PI	1	NA

Venesection	PI	1+II+III	5

NA: Not applicable

C) ICU Procedures

Procedure	Category	Year	Number
Insertion of Arterial lines	PI	II	10
Insertion of central venous lines	PI	II	10
Insertion of Endotracheal tubes	PI	II	10
Insertion of Peritoneal Dialysis Catheters	A/PA	1,II,III	5
Intercostal drainage	PI	II	5
Suprapubic puncture / Stab Cystostomy	PI	II	5
Tracheostomy	PI	1	2
Working knowledge of ventilators and various monitors	PI	1	NA
Interpretation of Arterial Blood gases	PI	1	NA
Correction of Electrolyte disturbances	PI	I	NA
Prescribing Parenteral and Enteral nutrition	PI	I	NA

d) Emergency Room Procedures

Procedure	Category	Year	Number
Application of Splints for fractures	PI	I	NA
Arterial and venous lines	PI	1	NA
Assessment and initial management of polytrauma	PI	I	NA
Cardiopulmonary Resuscitation	PI	I	NA
Management of Airway obstruction	PI	I	NA
Management of Shock and Cardiac / Respiratory failure	PI	I	NA
Recognition and initial management of surgical emergencies	PI	I	NA
Suturing Techniques	PI	I	NA

e) Preoperative work up

Procedure	Category	Year	Number
Ability for adequate pre- operative preparation in special situations like diabetes, renal failure, cardiac	PI	I	NA

and respiratory failure etc. and risk Stratification			
Communication skills with special reference to obtaining informed consent	PI	1	NA
Proper pre operative assessment and preparation of patients including DVT prophylaxis, Blood transfusion and antibiotics	PI	I	NA

f) Post operative Care

Procedure	Category	Year	Number
Airway management	PI	I	NA
Basic Physiotherapy	PI	1	NA
Management of epidural analgesia	PI	I	NA
Management of Fistulae	PI	I	NA
Management of postoperative hypotension and hypertension	PI	I	NA
Post operative pain control	PI	I	NA
Skills for Nutritional rehabilitation of patients	PI	I	NA
Skills for proper Fluid and Antibiotic management	PI	I	NA
Stoma care	PI	I	NA

g) Minor O.T. procedures

Procedure	Category	Year	Number
Circumcision under local anesthesia	PI	I	5
Drainage of abscess	PI	1	10
FNAC	PI	I	10
Major dressings	PI	I	20
Minor Anorectal procedures (Haemorrhoids – Banding, Cryotherapy, Anal dilatation)	PI	III	10
Minor Biopsies – Lymphnode, ulcer, swellings etc	PI	I	20
Reduction and plaster application of simple fractures and dislocations	PA	II	10
Removal of simple subcutaneous swellings	PI	I	10
Sigmoidoscopy and upper GI endoscopy (preferable in and endoscopy room)	PA/A/O	II	10
Suturing Techniques	PI	I	20
Vastectomy	PI / PA	1	5
Wound debridement	PI	I	10

h) Major Operating room techniques

Procedure	Category	Year	Number
Instrument arrangement and trolley layout	PA	I	NA
Skills in Sterilization techniques, O.T. Layout and asepsis	O	1	NA
Skin preparation – painting and draping	PI	I	NA
Techniques of scrubbing and gowning	PI	I	NA

General Surgical Operative Procedures

Procedure	Category	Year	Number
Appendicectomy	PA	I	10
Appendicectomy	PI	III	5
Cholecystectomy	PI ,PA	III	1 , 3
Closure of Colostomy	PA	III	2
Closure of perforated duodenal ulcer / under running bleeding ulcer	PI	III	3
Colostomy	PA	III	2
Cysts and sinuses of the neck	PA	III	2
Diagnostic Laparoscopy	PA	III	3
Drainage of Breast abscess/ Excision of breast lump	PI	I	10
Groin hernia repair	PI	II/ III	5
Gynaecomastia	PA	III	2
Haemorrhoidectomy/ Fistulectomy /Simple fistulectomy	See Minor OT procedures		
Hemicolectomy	PA	III	1
Herniotomy / Orchidopexy in children	PA	III	3
Laparotomy for abdominal trauma/ splenectomy	PI	III	3
Laparotomy for intestinal obstruction /bowel resections/ bowel anastomosis	PI	III	3
Management of complex wounds	PI	I	10
Mastectomy	PA/ A	III	2
Opening and closing the abdomen	PI	I	5
Opening and closing the chest	PI	III/ III	1
Parotidectomy	A	III	2
Release of bands and multiple adhesive obstruction	PI	II	5
Thyroid lobectomy / Thyroidectomy	PA	III	2

UGI Endoscopy	A/O	II /II	10
Ventilation	PI	II	5
Wide excision of breast tumours / Mastectomy / microdochectomy	PA	III	3
Gastrostomy / feeding jejunostomy	PA	III	3

Specialty Procedure

There may be repetition of some of the procedures listed under this category and those listed under General surgical procedures. Where different numbers are mentioned for the same / similar procedures between the general surgery and specialty lists, the higher number is applicable as the prescribed number. (Note that the total number is not the sum of the numbers mentioned for the same / similar procedures in the general surgery and specialty lists.)

Laparoscopy and GI Endoscopy

Procedure	Category	Year	Number
Diagnostic and therapeutic Upper and Lower GI Endoscopy	PA	III	10
Diagnostic Laparoscopy	PA	III	3
Diagnostic Upper GI Endoscopy	PA	III	10
Laparoscopic Cholecystectomy	A	III	3

Neuro surgery

Procedure	Category	Year	Number
Craniotomy	A	II	2
Management of paraplegia	A	II	2
Peripheral nerve repair	A	II	2
Prevention of nerve injury – specific operations	A	II	2
Suturing complex scalp wounds	PI	II	2
Trephining	PA	II	2

Urology

Procedure	Category	Year	Number
Catheterization	PI	I	20

Circumcision	PI	I	5
Diagnostic cystoscopy	PA/A	II	3
Inguinal block dissection	PA	II	1
Meatotomy	PI	II	3
Nephrectomy – partial / total	A	II	3
Nephrolithotomy	A	II	3
Orchidectomy	PA / A	II	3
Orchidopexy	A	II	3
Retroperitoneal lymph node dissection	O	II /III	1
Supra pubic Cystostomy	PI	II	3
Total/partial amputation of penis	A	II	1
TURP / Open prostatectomy	A	II	5
Ureterolithotomy	A	II	3
Urethral/ Urogenital injuries	A	II	3
Urethral dilatation	PI	II	5
Varicocele	PA/A	II	3
Vasectomy	PI	I / II / II	10

Oncology

Procedure	Category	Year	Number
All radical operations – Breast , Thyroid , GI and Facio – maxillary malignancies	A	II	2 EACH
Breast lumpectomy	PI	II	5
Functional neck node dissection	A	II	3
Gastrectomy / Bowel resection	A	II	3
Imprint cytology	PA	II	3
Metastatic workup	PA	II	5
Stoma care	PI	II	5
Thyroid surgery	A	II	5
U/s guided biopsy	A/O	II	3

Plastic Surgery

Procedure	Category	Year	Number
Burn resuscitation	PI	II	5
Lip surgery	A	II	5
Local blocks in anaesthesia	PI	I	10

Minor hand injuries	PI	II	5
Nerve repair	A	II	2
Post excision reconstruction	A	II	2
Reimplantation of digits	O	II	1
Skin flap surgery	O	II	2
Split skin graft	PI	II	3
Tendon repair	PA	II	2
Wound Debridement	PI	I	10

Paediatric Surgery

Procedure	Category	Year	Number
Anorectal Anomalies	A	II	2
Circumcision / Meatoplasty	PA	II	10
Herniotomy	PA	II/III	2
Intercostal aspiration	PI	II	2
Laparotomy for peritonitis	PA	II	5
Lymph node biopsy	PI	II/III	5
Non operative treatment of Volvulus	A/ O	II	2
Orchidopexy	PA/A	II	5
Ostomies	PA	II	2
Paediatric emergencies	A/PA	II	10
Pyloromyotomy	PA/A	II/ III	5

Cardiothoracic surgery

Procedure	Category	Year	Number
Canulation of artery and vein	A	II	2
Chest injuries	PA	II/ III	5
Empyema drainage / decortication	PI	II	2
Endotracheal intubation	PI	I	10
Intercostal drainage	PI	I	5
Lobectomies and pneumonectomies	O	II	2
Oesophageal surgery	O	II/ III	2
Opening and closing the chest	PA	II	2
Pericardiectomy	O	II	2

Removal of FBs	A	II/III	2
Remove pulse generator (pacing)	PA/A	II	1
Rib resection	PA	II/III	2
Tracheostomy	PI	III	5
Sternotomies	PA	II/III	2
Vein and arterial harvesting	PA/A	II/III	2
Ventilator Management	PA	I	10

Vascular surgery

Procedure	Category	Year	Number
AV shunts for vascular access	PA	II/III	2
Bypass graft – prosthetic	A	II/III	2
Conservative amputations	PI	II/III	5
Embolectomy	PA	II/III	2
Post traumatic aneurysms	A	II/III	2
Sympathectomy	PA	II/III	2
Use of heparin	PI	II/III	10
Varicose veins surgery	PI	II/III	2
Vascular suturing	PA	II/III	2
Vein graft	A/O	II/III	2
Vein patch repair	A/O	II/III	2

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full time student. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below. The students shall enter in the Log Book relevant details of all teaching/learning activities.

1. Lectures: Lectures are to be kept to a minimum. Lectures may be didactic or integrated.

Didactic Lectures: Recommended for selected common topics for postgraduate students of all specialties. Few topics are suggested as examples:

Bio-statistics
Research Methods
Medical code of Conduct and Medical Ethics
Communication Skills etc.

These topics may preferably taken up in the first few months of the Ist year. Few lectures or other type of exposure to human behavior studies shall be taken.

Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes mellitus, Thyroid etc.

Journal Club: Recommended to be held once a month. All the PG students are expected to attend and actively participate in discussion. Further, every candidate must make a presentation from the allotted journal (s), selected articles at least four times a year. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV).

Subject Seminar: Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion. Further, every candidate must present on selected topics at least four times a year and total of 12 seminar presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.

Student Symposium: Recommended as an optional multi disciplinary Programme. The evaluation may be similar to that described for subject seminar.

Ward Rounds: Ward rounds may be service or teaching rounds.

Service Rounds: Postgraduate students and Interns should do every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.

Teaching Rounds: Every unit should have grand rounds for teaching purpose. A diary should be maintained for day-to-day activities by the students.

Entries of (a) and (b) should be made in the Log book.

Clinico – Pathological Conference: Recommended once in three months for all post graduate students. Presentation to be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

7. Inter Departmental Meetings. Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a month. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

Pathology: Interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of Surgery and Pathology departments.

Radio-diagnosis: Interesting cases and the imaging modalities should be discussed.

Teaching Skills: Postgraduate students must teach under graduate students (Eg.

Medical,Dental,Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc.

Assessment is made using a checklist by surgery faculty as well students. (See model check in Chapter IV). Record of their participation be kept in Log book. Training of postgraduate students in Educational Science and Technology is recommended.

Continuing Medical Education Programmes (CME): Recommended that at least 2 National/State level CME programmes should be attended by each student in 3 years.

Conferences: Recommended that at least 2 National/State level conferences should be attended by each student in 3 years. The candidates are encouraged to present papers at these conferences/CME

Rotation and posting in other departments

The listed knowledge and skills are to learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic subjects, allied department and specialty departments is given below.

In the first year, during the morning session, student should work in the parent department. It is recommended that 2 years and 2 months are spent in general surgery and 10 months in allied and specialty departments. Depending on the time and opportunities available, some of the procedures listed for second year activity can be shifted to the first or third year. Students must be on call on a regular basis. The total duration of postings in core and other specialties will be eight months.

Basic science

Basic science should be an essential part of training. It should be done as concurrent studies during the 1st year of training. It is recommended that the candidate spends at least one hour daily, in the afternoons, for the first six months in the respective departments learning basic science relevant to surgery

Topics for study to include anatomy, Physiology, Pathology, Microbiology, Pharmacology, Anaesthesia and Radiology

Pathology: concurrent study – recommend daily grossing sessions, weekly surgical pathology sessions and monthly CPCs.

Radiology: adequate exposure to modern imaging modalities like USG, CT, MRI and angiography

Surgical specialty Subjects

Postings to other specialty departments will be during the second year. The departments and duration of postings are as under:

Department	duration
Paediatric surgery	4 weeks
Plastic surgery	4 weeks
CVTS	4 weeks
Neurosurgery	4 weeks
Urology	4 weeks
Oncology	4 weeks
GI surgery	4 weeks
Orthopaedics including trauma	8 weeks

(Accident and Emergency)

Anesthesia and ICU

4 weeks

Dissertation

Every candidate pursuing MS Degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of a dissertation

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within 6 months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the university. No change in the dissertation topic or Guide shall be made without prior approval of the university.

The dissertation should be written under the following headings

Introduction

Aims or objectives of study

Review of literature

Materials and methods

Results

Discussion

Conclusion

Summary

References

Tables

Annexures

The written text of dissertation shall not be less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the Department and head of the Institution.

Four copies of dissertation thus prepared along with the same matter on CD shall be submitted to the University, six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is essential precondition for a candidate to appear in the University examination.

For some more details regarding Guide etc., please see Chapter 1 and for books on research methodology, ethics etc., see Chapter IV.

Monitoring learning process

It is essential to monitor the learning process of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching/learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Chapter IV.

The learning outcomes to be assessed should include (i) Personal attitude (ii) acquisition of knowledge (iii) Clinical and operative skills (iv) Teaching skills and (v) Dissertation.

i) Personal attitudes. The essential items are

Caring attitude

Initiative

Organizational ability

Potential to cope with stressful situations and undertake responsibility

Trustworthiness and reliability

To understand and communicate intelligibly with patients and others

To behave in a manner which establishes professional relationships with patients and colleagues

Ability to work in team

A critical enquiring approach to acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Acquisition of Knowledge: The methods used comprise of Log Book which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities. If so, desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study. Presentation skills, and use of audio visual aids are to be assessed. The assessment is made by Faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills

and use of audio visual aids are to be assessed using a checklist (see Model Checklist II, Chapter IV)

Clinico - pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter (s) are to be assessed using a check list similar to that used for seminar.

Surgical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

iii) Clinical Operative skills

Day-to-Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model checklist IV, Chapter IV).

Clinical and Operative skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the logbook. (Table No.3, Chapter IV)

iv) Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist V, Chapter IV)

v) Dissertation in the department: Periodic presentation are to be made in the department. Initially the topic is to be presented before submission to the University for registration, again before finalisation for critical evaluation and another before final submission of the completed work (See Model Checklist VI & VII, Chapter IV)

vi) Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

vii) Work diary / Log Book – Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

viii) Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Log book

The log book is a record of the important activities of the candidates during his training, Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentation and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1,2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and Head of the Department. In extreme cases of default, the departmental committee may recommend that defaulting candidate be withheld from appearing for the examination, if she / he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Scheme of Examination

i) Theory

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions each question carrying 20 marks and 6 short essay questions each carrying 10 marks. However, one essay question in Paper 1 is recommended to be substituted by 20 MCQs, each carrying 1 mark. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows:

Paper I (Course 1 – U19MSG01): basic Sciences- 100 Marks
Anatomy

Physiology

Other basic science topics covered in syllabus

CO1: Application of Basic Science Knowledge in Surgical Skills

CO2: Knowledge of Basic Surgical Principles

CO3: Knowledge of Asepsis and Antisepsis

CO4: Proper theatre etiquette

Introduction to Surgery, Basic Surgical Principles. Wounds, tissue repair and scars. Critical care: fluid, electrolyte and acid-base balance: Blood transfusion. Nutritional support and rehabilitation. Anaesthesia and pain relief. Wound infection. Special infections. Acquired immunodeficiency Syndrome (AIDS). Sterile precautions. Transplantation. Tumours, Cysts, Ulcers, Sinuses. Plastic and reconstructive surgery, Skin lesions. Burns. Arterial disorders. Venous disorders. Lymphatic system. Day surgery. Audit in surgery. Surgical ethics.
Basic sciences include anatomy, physiology, biochemistry, microbiology and pathology as found in current textbooks. The stress is on applied anatomy of areas dealt with by surgeons , pathophysiology and surgical pathology.

Paper II (Course 2 – U19MSG02): General Surgery, Head, Neck and Thorax

CO1: Ability to manage surgical patients in community.

CO2: To identify surgical diseases in the Head and Neck region and make a clinical diagnosis and plan further management.

CO3: Ability to manage common wounds with various types of dressings, appropriate with the presenting wound and area..

CO4: Acquire surgical Skills to do life saving thoracic surgery procedures.

100 Marks

Eye and orbit. Cleft lip and palate, developmental abnormalities of the face, palate, jaws and teeth. Maxillofacial injuries. Nose and sinuses. Ear. Oral and oropharyngeal cancer and precancer. Salivary gland disorders. Pharynx, larynx and neck. Thyroid gland and the Thyroglossal tract. Parathyroid and Adrenal glands. Breast . Thorax. Heart and pericardium.

Paper III (Course 3 –

U19MSG03) GI Surgery

CO1: To identify and manage common emergency general surgical illnesses, including acute appendicitis and other acute abdominal causes.

CO2: Knowledge about follow up of post operative cases as regards to complications and other management.

CO3: Ability to diagnose and manage chronic abdominal conditions and malignancies of the GI system.

100 Marks

Anastomoses, Oesophagus. Stomach and duodenum. Liver. Spleen . gallbladder and bile ducts. Pancreas. Peritoneum, omentum, mesentery and retroperitoneal space. Small and large intestines. Intestinal obstruction. Vermiform appendix. Rectum. Anus and anal canal. Hernias, Umbilicus, Abdominal wall. Principles of Laparoscopic surgery. Diagnostic Laparotomy,

Management of blunt abdominal injuries

Introduction to NOTES (Natural Orifice Transluminal Endoscopic Surgery)

Paper IV (Course 4 – U19MSG04)

Surgical Specialities and Recent Advances

100 Marks

CO1: Thorough knowledge about recent surgical advances and application of the same with evidence on the patient.

CO2: Clinical diagnosis and management of common surgical diseases like acute/chronic retention of urine, acute vascular emergencies and diseases of other surgical specialties effectively.

CO3: Knowledge of clinical examination and diagnosis of cases which require referral to higher surgical specialties.

Orthopedics: Musculoskeletal disorders. Fracture and dislocations- General, specific. Diseases of bones and joints- infection, tumours, generalized diseases and chronic joint diseases, congenital disorders. Wrist and hand . Foot.

Surgical correction of plexus injuries

Management of open fractures

Post fracture rehabilitation of the patient

Nervous system : Neurological disorders affecting the musculoskeletal system. Spine, vertebral column and spinal cord. Nerves. Cranium (scalp, skull, brain).

Genito- urinary system: Urinary symptoms, Investigation of the urinary tract, anuria. Kidneys and ureters. Urinary bladder. Prostate seminal vesicles. Urethra and penis. Testis and scrotum.

Paper V: Soft Skills (Elective)U19SSE05

CO1: Communication skills and respect for patients rights and privileges

CO2: Ethical Decision Making regarding surgical procedures

CO3: The ability to conduct a scientific research CO4: Multitasking and management.

Communication skills and respect for patients rights and privileges . Ethical Decision Making regarding surgical procedure. The ability to conduct a scientific research. Multitasking and management.

Note: The distribution of chapters / topics shown against the papers are suggestive only.

ii) Clinical

There shall be one long case and two short cases to be examined and presented by each candidate.

Type of cases

Long case 1 100 marks

Short cases 2 (50 x 2) 100 marks

Viva voce

1) Viva voce examination: (80 Marks)

All examiners will conduct viva voce on all components of course contents. In addition, candidates may be also be given case reports, charts, gross specimens, Histo pathology slides, X-rays, ultrasound, CT scan images, etc., for interpretation. Questions on operative surgery and use of instruments will be asked. It includes discussion on dissertation also.

2) Pedagogy Exercise: (20 Marks)

A topic be given to each candidate in the beginning of clinical examination. He/she is asked to make a micro-teaching presentation(for under graduate level) on the topic of 8-10 minutes.

iv)

Maximum marks for M.S Gen. Surgery	Theory 400	Practical 200	Viva 100	Grand Total 700

Recommended books and Journals
Textbooks

Charles V, Mann, R.C.G. Russell, Norman S. Willians, Bailey and Loves Short Practice of Surgery 24th Edition, Chapman & Hall

David C. Sabiston: Text book of Surgery: The Biological Basis of Modern Surgical Practice, 17th Edition, 1971, W.B. Saunders

Seymour I. Schwarts, G. Tom Shines, Frank C. Spencer, Wendy Cowles Husser: Principles of Surgery, Vol. 1& 2,7th Edition, 1999, Mc. Graw Hill

JSP Lumley: Hamilton Baileys Physical Signs, 18th Edition, 1997, Butterworth / Heinemann.

R.W.H.McMinn: Lasts Anatomy: Regional and Applied 10th Edition, 1999, Churchill Livingstone.

Sir Charles Illingworth, Bruce M. Dick, A Text Book of Surgical Pathology, 12th Edition, 1979, Churchill Livingstone.

K.Das: Clinical Methods in Surgery, 8th Edition, 1868, Suhas Kumar Dhar, Calcutta

R.F.Rintoul: Farqharsons Text Book of Operative Surgery, 8th Edition, 1995, Churchill Livingstone

Somen Das: A practical Guide to Operative Surgery, 4th Edition, 1999, S. Das, Calcutta.

Pankaj Patel, V.V.Devoodkar, Handbook of Surgical Instruments for Undergraduates, 1992, Bhalani publishing, House

R.A.Jamieson and A.W.Kay: Textbook of Surgical Physiology, Lavingstone.

James Kyle: Pyes Surgical Handicraft, Indian Edition, K.M. Varghese Company.

Revision- Number / Latest edition + consolidations

Reference text books

William F. Ganong : Review of Medical Physiology, 2000, Lange Medical Publication

Roshan Lall Gupta: Year Book of Surgery, (Series) Jaypee Brothers\

Roshan Lall Gupta : Recent advances in Surgery, (Series) Jaypee Brothers

I.Taylor and C.D. Johnson : Recent Advances in Surgery, (Series) Churchill Livingstone.

Lloyd M. Nyhus, Robert J.Baker and Joseph E. Fischer : Mastery of Surgery Vol. 1 & 2, 3rd Edition, 1997, Little Brown & Company.

Peter J.Morris and Ronald A Malt : Oxford Text Book of Surgery. Vol. 1 & 2, 1994, Oxford University Press

Charles Rob and Rodney Smith : Operative Surgery (All Volumes). 2nd Edition. 1971, Butterworths.

C.Palanivelu : Art of Laproscopic Surgery .1999 . Paras Publishing

Michael J. Zinner, Seymour I. Schartz and Harold Ellis: Maingot's abdominal operations, Vol. 1& 2, 10th Edition, 1997. Prentice Hall International.

Kevin G. Burnand and Anthony E. Young: The New Aird's companion to surgical studies, 1992, Churchill Livingstone.

Guyton: Text Book of Medical Physiology .9th Edition, 1998, W.B. Saunders.

Hamilton Bailey: Emergency Surgery, 1999, Butterworth

Cuschiery: Essentials of Surgical Practice, 3rd Edition, 19954, K.M. Verghese Company

Goliger: Surgery of the Anus, Ractum and Colon

Oxford text book of surgery

Lee McGregor: Synopsis of Surgical Anatomy, 12th (Indian) Edition, 1998, K.M. Verghese Company

W.T Irvine: Modern Trends in Surgery, Series, Butterworths

Reference books

Irving Taylor, Timothy G. Cooke and Perra Guillou: Essential General Surgical Oncology, 1996, Churchill Livingstone.

James A, O'Neil, Maro I. Owe. Jay L, Grosfeld, Eric W. Fopnkalsrud and Arnold G. Coran: Pediatric Surgery, Vol. 1 & 2, 5th Edition, 1998, Mosby

Anthony S Fauci and Ouners Haririson's Principles of Internal Medicine. Vol. 1 & 2. 14th Edition, 1998, Mc Graw Hill

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Model checklist for Assessment of Scientific papers for publications

Sl.No	Criteria	Distribution of marks	Marks awarded
1	Originality	10	
2	Clarity and quality of presentation	10	
3	Relevance	10	
4	Review of literature	10	
5	Quantum of works involved	15	
6	Methodology, sensitivity, sample size, controlled, not controlled study etc	25	
7	Advancement in knowledge	10	
	Total	90	

Chapter IV

Monitoring Learning progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring is to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Model checklists are given in this chapter which may be copied and used.

The learning outcomes to be assessed should include: (i) Personal Attitudes,(ii) Acquisition of Knowledge, (iii) Clinical and operative skills, and (iv) Teaching skills.

i) Personal Attitudes. The essential items are:

Caring attitudes

Initiative

Organisational ability

Potential to cope with stressful situations and undertake responsibility

To understand and communicate intelligibly with patients and others

To behave in a manner which establishes professional relationships with patients and colleagues

Ability to work in team

A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) Acquisition of Knowledge: The methods used comprise of Log Book which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities if so desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study. Presentation skills, and use of audio visual aids are to be assessed. The assessment is made

by Faculty members and peers attending the meeting using a checklist (see Model Checklist – I, Chapter IV)

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in-depth study. The ability to do literature search, presentation skills and use of audio visual aids are to be assessed using a checklist (see Model Checklist II, Chapter IV)

Clinico - pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter (s) are to be assessed using a check list similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meetings are to be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

iii) Clinical skills

Day-to-Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model checklist IV, Chapter IV).

Clinical and procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the logbook. (Table No.3, Chapter I

iv) Teaching skills: Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (See Model checklist V, Chapter IV)

v) Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. In case of diploma courses of two-year duration, the departments may conduct two tests. One of them at the end of first year and the other in the second year three months before the final examination. The tests may include written papers, practicals/clinicals and viva voce.

vi) *Work diary / Log Book* – Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

vii) Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

The log book is a record of the important activities of the candidates during his training, Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentation and procedures carried out by the candidate.

Format for the log book for the different activities is given in Tables 1,2 and 3 of Chapter IV. Copies may be made and used by the institutions.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she / he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

CHAPTER IV (CONTD.)

Format of Model Check Lists

Check List – I MODEL CHECK LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:		Name of the Faculty / Observer:				Date
	Items for observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have been consulted					
4.	Whether other relevant publications consulted					
5.	Ability to respond to questions on the paper/subject					
6.	Audio-Visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					

9.	Any other observation					
	Total Score					

Check List – II

MODEL CHECK LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty / Observer:

Date

	Items for observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Whether other relevant publications consulted					
2.	Whether cross reference have been consulted					
3.	Completeness of Preparation					
4.	Clarity of presentation					
5.	Understanding of subjects					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio – Visual aids					
9.	Overall performance					
10.	Any other observation					
	Total Score					

Check List – III

MODEL CHECK LIST FOR EVALUATION OF CLINICAL WORK IN WARD/ OPD

(To be completed once a month by respective Unit Heads including posting in other departments)

Name of the Student:

Name of the Unit head :

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Bedside manners					
8.	Rapport with patients					
9.	Counseling patients relatives for blood donation or Post mortem and Case follow up					
10	Over all quality of Ward work					
11.	Total Score					

Check List – IV

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the Student:

Name of the Faculty:

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Completeness of history					
2.	Whether all relevant point elicited					

3.	Clarity of presentation					
4.	Logical order					
5.	Mentioned all positive and negative points of importance					
6.	Accuracy of General physical examination					
7.	Whether all physical signs elicited correctly					
8.	Whether any major signs missed or misinterpreted					
9.	Diagnosis: Whether it follows logically from history and findings					
10	Investigations required Complete list					
	Relevant order					
	Interpretation of investigations					
11.	Ability to react questioning Whether it follows logically from history and findings					
12	Ability to defend diagnosis					
13.	Ability to justify differential diagnosis					
14	Others					
	Grand Total					

Check List – V

MODEL CHECK LIST FOR EVALUATION OF TEACHING SKILL PRACICE

Name of the Student:

Name of the Faculty:

Date

Sl No		Strong Point	Weak Point
1.	Communication of the purpose of the talk		

2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequence of ideas		
5.	The use of practical examples and /or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses A V aids appropriately		

Check List – VI

MODEL CHECK LIST FOR DISSERTATION PRESENTATIONS

Name of the Student:

Name of the Faculty:

Date

Sl No	Points to be considered	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide and other faculty					
4.	Quality of protocol					
5.	Preparation of proforma					
	Total Score					

Check List – VII

CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO – GUIDE

Name of the Student:

Name of the Faculty:

Date

Sl No	Items for observation during presentations	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1.	Periodic consultation with guide / co-guide					
2.	Regular collection of case material					
3.	Depth of analysis / discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	Total Score					

LOG BOOK

Table – 1: Academic activities attended

Name:

Admission Year:

College:

Date	Type of Activity Specify Seminar, Journal Club, Presentation, UG Teaching	Particulars

LOG BOOK

Table – 2: Academic presentation made by the student

Name:

Admission Year

College:

Date	Topic	Type of Presentation Specify Seminar, Journal Club, Presentation, UG Teaching etc

LOG BOOK

Table –3: Diagnostic and Operative procedures performed

Name: Admission Year

College:

Date	Name	ID No	Procedure	Category O, A, PA, PI*

- * Key O - Washed up and observed
 A - Assisted a more senior Surgeon
 PA –Performed procedure under the direct supervision of a senior surgeon
 PI – performed independently

Model Overall Assessment Sheet

Name of the college:

Academic Year

Sl. No	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1											
2											
3											
4											
5											
6											
Total Score											

Note: Use separate sheet for each year



BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

PROGRAM

MS OBSTETRICS AND GYNAECOLOGY

(Revised with effect from 2019-2020 onwards)

GOAL

- A post graduate is expected to acquire knowledge of Anatomy, Physiology, Pharmacology and Patho-physiology related to reproductive system and reproductive medicine so that he/she is competent to manage pathological state related to these efficiently and effectively backed by scientific knowledge and skill.
- Should learn to maintain high ethical standard and should exercise empathy and caring attitude.
- Should have keen interest in acquiring newer skills and continuing education in the specialty.
- Should be a specialist keen to share skills and knowledge to colleagues and juniors.

OBJECTIVES

- With the knowledge and skills developed at the completion of the course, the candidate shall be able to :-
- Offer to the community, the current quality of 'Standard care' in obstetrics and gynaecological diagnosis' as well as referred conditions.
- Periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice
- Be aware of his or her own limitations to the application of the speciality in situations which warrant referral to major centers or individuals more qualified to treat.
- Apply research and epidemiological methods during his/her practice. The candidate shall be able to present or publish work done by him/her.
- Contribute as an individual or in a group or institution towards the fulfillment of national objectives with regard to prevention of maternal mortality and morbidity and improving the neonatal outcome.
- Effectively communicate with patients or relatives so as to educate them sufficiently and give them full benefit of informed consent to treatment and ensure compliance.

- Effectively communicate with colleagues.
- Interpret various laboratory investigations and other diagnostic modalities in obstetrics and gynaecology.
- Diagnose and manage paediatric and adolescent gynaecologic problems and Post-menopausal and geriatric gynaecologic problems.
- Have knowledge about asepsis, sterilization and disposal of medical wastes.
- Use newer information technologies (computer and internet)

Program Outcomes

PO1 : MEDICAL KNOWLEDGE Acquisition of theoretical knowledge regarding the basic sciences (anatomy, Physiology, Pathology, Pharmacology) pertaining to reproductive system

PO2 : EFFICIENT DIAGNOSTICIAN : Differentiate physiological & pathological states pertaining to reproductive system

PO3 : SKILL ACQUISITION : Acquiring skills to manage the physiological & pathological states.

PO4 : STANDARDISED CARE : Offering Standard, Ethical & unbiased patient care

PO5 : MASTERLY PERFORMANCE : Prenatal Diagnosis & managing "High risk" pregnancies

PO6 : INDIVIDUALISED APPROACH : Providing Individualised family planning methods (Contraception, sterilisation) in par with the legal systems pertaining in the country.

PO7 : MODERN DAY LEARNING : Updation of the knowledge regarding ongoing advances in management of disease conditions & inquisitiveness in research materials.

PO8 : LIFE LONG LEARNING : Participation in Workshops / Conferences / research activities

PO9 : EPIDEMIOLOGIST : Screening for communicable / non-communicable disease status in the population & educating regarding awareness of gynec cancers

PO10 : COMPETANT CLINICIAN : Diagnosing and managing common paediatric/ adolescent / geriatric gynaecologic problems

PO11 : ETHICAL & EMPATHETIC PRACTITIONER : Ethical practice in managing Infertility / Gynecological malignancies

PO12 : HEALTH PROGRAMMES : Awareness of National health policies, state health policies, scientific committee & bodies related to Obstetrics & gynecology

Program Specific Outcomes

PSO1 : Acquiring skills & scientific knowledge in Obstetric & gynecological care

PSO2 : Performing procedures & interventions abiding to standard protocols & practises

PSO3 : Participation in research activities

Course Contents

It includes topics not only of Obstetrics and Gynaecology but also those aspects of Medicine, surgery, Pediatrics applied Anatomy, Physiology, Pathology, Pharmacology and Microbiology relevant to the practice of both Obstetrics and Gynaecology. It is intended as a guide to the candidates and it is not comprehensive. As and when there is newer development it becomes eligible for inclusion.

Theory

Basic Sciences

Genetics

- Normal and abnormal karyotypes
- Pattern of inheritance
- Chromosomal abnormalities-types incidence diagnosis, management and recurrence risk.
- Screening counseling and prevention of developmental abnormalities and birth defects including intersex.
- Genetic aspects of infertility and early pregnancy loss-diagnosis management and counseling.
- Genetic aspects of artificial reproductive technologies.
- Prenatal diagnosis and fetal therapy.

Anatomy including Embryology

Gametogenesis, ovulation, fertilization, implantation, development of fetus and placenta. Development of male and female genital tract. Problems of abnormal development of genital tract in Obstetrics and Gynaecology. Anatomy of urogenital system, including pelvic musculature. Blood supply, innervation and lymphatic drainage of pelvic and reproductive organs.

Pathology

Pathology of inflammatory disease, degenerative and neoplastic disease of vulva, vagina, cervix and uterus, fallopian tubes, ovaries and broad ligament.

Haematology

Blood groups, Rh factor, incompatibility, blood transfusion.

Biochemistry

Steroid and prostaglandin synthesis and metabolism in mother and foetus. Maternal and fetal carbohydrate, lipid, amino-acid metabolism and iron metabolism. Synthesis and secretion of fetal pulmonary surfactant.

Endocrinology

Structure, synthesis, function, metabolism and principles of assay of hormones, produced from hypothalamus, Anterior and posterior pituitary, Thyroid, Pancreas, Adrenal cortex, adrenal medulla, Ovary, Testis and placenta.

Pharmacology

Placental transfer of drugs and its effects on mother and foetus, Eg: Antibiotics, anti hypertensives, Psychotropic drugs, Oral contraceptives, Chemotherapeutic drugs, Anticonvulsants, Anti coagulants and Oxytocic drugs, effects of tobacco and alcohol on pregnant mother and foetus. Teratogenic effect of drugs taken during lactational period.

Immunology

Basic immunology including primary and secondary immune response, mechanism of antibody production. HLA system and graft rejection. Change in pregnancy and the

foetus as a graft. Immunological pregnancy tests. Rhesus and other Isoimmunisation. Active and passive immunization and Auto immune disease.

Microbiology

Epidemiology and pathophysiology of disease developing in pregnancy that is Septic abortion, Preterm labour, PROM, Puerperal sepsis, Mastitis, Septic shock and Neonatal sepsis. Microbiology of TORCH infection, Syphilis, Chlamydia, Mycoplasma, hepatitis and HIV.

Maternal physiological changes during pregnancy

- Fluid and electrolyte balance.
- Changes in respiratory, Cardio vascular system.
- Changes in Gastro-intestinal system – including liver and pancreas.
- Change in urinary system.
- Hematological changes including coagulation mechanism and fibrinolytic system.

Teratology

Mechanism of teratogenesis. Effect of possible teratogens- drugs virus radiation and other agents.

Antenatal care

Includes diagnosis of pregnancy, identification of high maternal and fetal complications and identification of high risk mothers and fetuses with appropriate modalities of investigation, advice to the expectant mothers regarding diet, exercise, immunization, warning symptoms of complications and educate her to prepare herself

for normal delivery. Monitoring of fetal and maternal well-being and selection of place of delivery.

Physiology of Labour

- Causation of onsets of labour
- Intrapartum care
- Maternal and foetal monitoring
- Mechanism and management of normal labour.

Abnormal Pregnancy

- Medical disorders complicating pregnancy and childbirth.
- Obstetric complications.
- Multifetal pregnancy
- Repeated pregnancy loss
- Trophoblastic diseases
- Congenital malformations
- Ectopic pregnancy
- Foetal growth restriction
- Foetalmacrosomia
- PPRM and preterm labour
- Prolonged pregnancy
- Malpositions and presentations
- Abnormalities of placenta, membranes and umbilical cord
- Rh incompatibility
- Shock and collapse

Labour and delivery

- Induction of labour

- Active management of labour
- Intrapartum Surveillance of fetal and maternal well being.
- Assessment of pelvis and cephalo-pelvic disproportion
- Active management of third stage of labour.

Abnormalities of labour and delivery

- Prolonged labour
- Abnormal uterine action
- Post-partum haemorrhage
- Retained placenta
- Postpartum shock and collapse

Puerperium

- Physiology of normal puerperium
- Complications of puerperium including puerperal sepsis

Social obstetrics

Study of interplay of social and environmental factors and human reproduction going back to premarital a preconception period.

- Implementing safe motherhood initiative
- Community maternal health care
- Antenatal checkup
- MCH problems
- Risk approach of pregnant women – Anaemia, STD syphilis, tetanus, AIDS.
- Domiciliary care

- Postnatal complications
- Low birth weight (L.B.W)
- Socio economic status and birth weight correction
- Infant feeding
- Road to health chart and school health programme
- Pre pregnancy and post pregnancy counseling
- Reproductive and child health (RCH)
- National Health programmes

Family welfare programmes including Reconstructive surgeries.

Temporary methods:

Chemical contraceptives

Barrier methods

Hormonal and non- hormonal contraception

IUD

Permanent methods:

Tubectomy – postpartum and concurrent

Laparoscopic tubal ligation

Minilap

Vasectomy

Reconstructive surgeries

Tuboplasty

Vasovasostomy

Medical termination of pregnancy

MTP Act

1st and 2nd Trimester MTP

Perinatology

The term new born infant

Low birth weight baby, - Preterm, - IUGR

Asphyxia neonatorum

Respiratory distress

Jaundice in new born

Haemorrhagic disease of newborn

Convulsions in newborn

Injuries of the newborn

Infection of newborn

Diarrhea in newborn

Vomiting of the newborn

Congenital malformation of newborn.

Neonatology

Early neonatal complication, infection and management.

Mortality and morbidity:

Epidemiology, Magnitude of the problem, causes, prevention and management of Maternal mortality and morbidity. Perinatal mortality.

Gynaecology

History taking with special reference to Gynaecological history, abdominal and pelvic examination, relevant investigation to arrive at most probable diagnosis.

Topics includes: Infection, Newgrowths (both benign and malignant) and other pathological disorders of vulva, vagina, urinary bladder, cervix, uterus, fallopian tubes, Ovaries and Pelvic cellular tissues including pelvic organ prolapse, STD and HIV.

Adolescent Gynaecology

Menstrual disorders, including amenorrhoea, menopause, postmenopausal
Gynaecological problems and management of the aged and elderly women.
Chromosomal disorders – including intersex.
Gynaecologic clinical cytopathology.
Contraception and family planning
Infertility and ART
Hormones therapy.
Problem of sex and marriage.

Clinical obstetrics and gynaecology

Obstetrics:

Diagnosis of early pregnancy and its complication and management.
AIM of ANC and management of high-risk pregnancies.
To work in labour wards and to manage normal and complicated deliveries.
Neonatal care and resuscitation in labour wards.
Follow up of normal and abnormal deliveries during postnatal period.
Assisting caesarean section initially, by the end of the course, they shall be able to do caesarean sections independently.
ICU Management.
Family welfare programmes and reconstructive surgeries of the fallopian tubes.
Rural obstetrics care and referral services.

Gynaecology

- To work in O.P.D and examine Gynaecology cases routinely.
- Minor operations: To assist in the beginning and carry out work independently by the end of I year.
- Major Operations: To assist as second assistant for the I six months and as first assistant for the next 6 months and do major operations like vaginal hysterectomy with P.F.R. and abdominal hysterectomy, Ovariotomy with the assistance of

senior doctors. By the end the course the candidate shall be familiar with the techniques of above mentioned operations and to do independently.

- To do investigations like HSG and USG under guidance initially and independently by the end of course.
- To assist medico legal cases.
- Writing case records.
- Candidate should write separate PG case sheets, They should keep diary and log book and get verified by the Unit Chief by the end of each month.

Essential Research Skills

1. Basic statistical knowledge.

- Ability to undertake clinical and basic research.
- Descriptive and inferential statistics
- Ability to publish results of one's work.

2. This could be achieved during the course by attending workshops on research methodology, basic statistics classes and regularly having journal clubs etc., where selected articles are taken and evaluated for content quality and presentation.

Communication abilities

Ability to interact with and work as a team with other colleagues, with patients and with teachers.

Record keeping

The ability to maintain records as scientifically as possible. Knowledge of computer is helpful.

Surgical Skills

1. Conducting minimum 25 cases of normal delivery including forceps and ventouse application.

Episiotomy repair, colposynthesis 3rd degree perineal tear suturing.

2. Tubectomy both mini lap and Laparoscopic sterilization.

Minor O.T. Procedures

MTP, D&C, suction evacuation, M.R. Mid-Trimester procedures extraamniotic instillation with of 2% ethacardine inj, Local application cerviprime gel insertion of intrauterine devices.

Cervical and Endometrial biopsy, electric coagulation and cold cautery tube testing procedure and histopathology.

Cervical biopsy, pap-smear.

Diagnostic Laparoscopy and colposcopy.

Major O.T. Procedures:

- Caesarean section minimum 10 to be done and 20 operations to be assisted.
- Vaginal hysterectomy minimum 20 to be assisted and 5 to be performed.
- Abdominal hysterectomy minimum 20 to be assisted and 5 to be performed.
- Ovariectomy.
- Cervical cerclage
- Caesarian hysterectomy
- Salpingectomy for ectopic pregnancy
- Laparotomy

Special Operations (Only to assist)

- Tuboplasty
- Myomectomy
- Ovarian de-bulking operation
- Ventrofixation (Gilliam's operation)
- Sling operations for prolapse
- Wertheim's hysterectomy.

- Simple and radical cullectomy
- Operation for stress incontinence

Year wise structured Training Schedule

I year

Theoretical knowledge, basic sciences

Examination and diagnosis of Obstetrics and Gynaecological cases with relevant investigations case recording.

Surgical skills

Assisting caesarian sections as second assistant initially and later on as first assistant, with supervision.

Assisting all major gynaecological operations like, vaginal and abdominal hysterectomies as a second assistant.

Minor operations

Assisting minor operations like M.T.P, Tubectomy, Laparoscopy, Cervical biopsy, D and C in the initial period, and later on doing independently under supervision.

II year

Theoretical knowledge of Allied subjects:

Clinical examination and diagnosis: The student is encouraged to take diagnostic, investigational and therapeutic decisions.

Surgical Skills: At the end of the second year the student should be capable of operating without assistance but under supervision, like caesarean section and minor operations like, M.T.P. cervical biopsy, D & C, tubectomies, outlet forceps, emergencies during delivery. The student must know how to manage the complications during and after delivery confidently.

Conference and workshops: Encouraged to attend one conference of State level and at National level. Presentation of paper in the conference should be encouraged.

The student should be involved actively in presentation of seminars, panel discussion, Journal clubs and case discussions with seniors, and to maintain record in Logbook.

IIIrd year

Should be through with basic, allied and recent advances.

Clinical diagnosis and Examinations:- Should be able to make clinical diagnosis and be familiar with techniques of operations like caesarean sections , abdominal and vaginal hysterectomies, reconstructive surgeries of fallopian tubes and surgeries on ovarian tumours. Techniques of assisted reproductive technologies.

Teaching activities: Final year student should take lead in conducting seminars, panel discussions, Journal clubs and case discussions with I and II year students. The student should involve himself/ herself in teaching undergraduate students specially bedside clinics.

The student should attend National and State level conferences, C.M.E. Programmes and workshops on colposcopy. Hysteroscopy and endoscopic surgeries, including ultrasound guided procedures. The student must also be exposed to the Assisted reproductive technologies like, I.V.F-E-T. ICSI, and also to observe radical surgeries in Gynaec-Oncology.

Rotation and Labour ward Postings

The student must work in labour wards at least 6 months during II & III year. (3 months each year).

Pediatrics: 1 month

Radio-diagnosis including Ultrasound and NST: 1month

Radiotherapy (oncology): 1month

Anesthesia: 1month

Teaching /Learning Experience

Teaching and Learning Activities

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below:

1. Lectures: Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

- a. Didactic Lectures: Recommended for selected common topics for post-graduate students of all specialties. Few topics are suggested as examples:

Bio-statistics

Use of library

Research Methods

Medical code of conduct and Medical Ethics

National Health and Disease Control Programmes

Communication Skills etc.

These topics may preferably taken up in the first few weeks of the 1st year.

- b. Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, Diabetes Mellitus, Thyroid etc.

2. Journal Club: Recommended to be held once a week. All the PG students are expected to attend and actively participate in the discussion and enter in

the Log Book relevant details. Further, every candidate must make a presentation from the allotted journals, selected articles at least four times a year and a total of 12-seminar presentation in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment. A timetable with names of the student and the moderator should be announced at the beginning of every year.

3. Subject seminar: Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the Log Book relevant details. Further, every candidate must present on selected topics at least four times a year and a total of 12 seminar presentations in three years. The presentation would be evaluated using checklists and would carry weightage for internal assessment. A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of the every year.

4. Student Symposium: Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.

5. Attending OPD work

6. Ward Rounds: Ward rounds may be service or teaching rounds.

- a. Service Rounds: Postgraduate students and Interns should do every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
- b. Teaching Rounds: Every unit should have 'grand rounds' for teaching purpose. A diary should be maintained for day to day activities by the students.

Entries of (a) and (b) should be made in the Log book.

7.Clinico-Pathological Conference: Recommended once a month for all post graduate students. Presentation be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

8.Inter Departmental Meetings: Strongly recommended particularly with departments of Pathology and Radio-Diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the Log Book.

Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of Surgery department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advance immuno-histo-chemical techniques, the burgeoning markers other recent developments can be discussed.

Radio-diagnosis: Interesting cases and the imaging modalities should be discussed.

9.Teaching skills: Post graduate students must teach under graduate students(Eg. Medical, nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by surgery faculty as well students. Record of their participation be kept in Log book. Training of post graduate students in Educational Science and Technology is recommended.

10.Continuing Medical Education Programmes(CME): Recommended that at least 2 state level CME programmes should be attended by each student in 3 years.

11. Conferences: Attending conferences is optional. However it is encouraged.

The unit heads should scrutinize it every weekend. HOD., should see and sign at the end of each unit posting.

i. P.G posted to each unit should write the case history examine the patients in detail and carry out the investigations and shall be responsible for pre operative and post operative care. By the end of the unit posting, shall submit the same to the unit chief and take the signature.

- ii. 1. Clinical cases: Each M.D. student should present at least 20 clinical cases for discussion in the three year posting (10 Obstetrics and 10 Gynaecology)
- 2. Journal Club: Each candidate shall present at least 10 papers on recent advances in Obstetrics and Gynaecology from latest journals in the Journal clubs.
- 3. Subject Seminar: They shall participate actively in minimum of eight subject seminars.
- 4. They should actively undertake the undergraduate teaching programmes.

C.M.E programmes: shall attend CME programmes and shall present minimum of two papers in any of the Scientific conferences.

Dissertation

Every candidate pursuing degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a

hypothesis, search and review, of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of RGUHS, in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation should be written under the following headings:

- Introduction
- Aims or Objectives of study
- Review of Literature
- Material and Methods
- Results
- Discussion
- Conclusion
- Summary
- References
- Tables
- Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper 9 (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the institution.

Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the university. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

Monitoring Learning Progress

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects.

The learning outcomes to be assessed should included: (i) Personal Attitudes, (ii) Acquisition of knowledge, (iii) Clinical and operative skills, (iv) Teaching skills and (v) Dissertation.

i. Personal Attitudes. The essential items are:

Caring attitudes

Initiative

Organisational ability

Potential to cope with stressful situations and undertake responsibility

Trustworthiness and reliability

To understand and communicate intelligibly with patients and others

To behave in manner which establishes professional relationship with patients and colleagues.

Ability to work in team

A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii. Acquisition of knowledge: The methods used comprise of ‘Log book’ which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using the checklist.

Seminars / Symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio – visual aids are to be assessed using a checklist.

Clinico- pathological conferences: This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenters are to be assessed using a checklist similar to that used for seminar.

Medical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

iii Clinical Skills

Day-to-Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidate’s sincerity and punctuality, analytical ability and communication skills.

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a checklist.

Clinical procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is

assessed by the guide by direct observation. Particulars are recorded by the student in the logbook.

iv. **Teaching skills:** Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students.

v. Dissertation in the Department: Periodic presentations are to be made in the department. Initially the topic selected is to be presented before submission to the University for registration, again before finalisation for critical evaluation and another before final submission of the completed work.

vi. Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

vii. Work diary/Log book- Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate.

viii. Records: Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

Logbook

The logbook is a record of the important activities of the candidates during his training; Internal assessment should be based on the evaluation of the

logbook. Collectively, logbooks are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Procedure for defaulters: Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Courses/Papers

Paper - I Basic Science as Applicable to Obstetrics and Gynaecology(Course Code U19MSOB01)

- CO1: Thorough Knowledge of embryogenesis, anatomy of the genital system
- CO2 : Knowledge of Reproductive physiology, menarche, menstrual cycle, ovulation, menopause & role of hormones in female reproductive system.
- CO3 : Understand the normal & abnormal flora of the genital tract, infectivity of the organism & pathogenesis of STDs.
- CO4 : Elaborate on the etiopathogenesis of congenital, inflammatory & neoplastic diseases pertaining to female reproductive system & correlation with histopathologies.
- CO5 : Relevant knowledge of common drugs, hormonal supplements, anticoagulants, anti-hypertensives, anticancer medications & drugs specific to obstetric& gynecology.

Anatomy including Embryology

Gametogenesis, ovulation, fertilization, implantation, development of fetus and placenta.**Development of male and female genital tract.Problems of abnormal development of genital tract in Obstetrics and Gynaecology.** Anatomy of urogenital system, including pelvic musculature. Blood supply, innervation and lymphatic drainage of pelvic and reproductive organs.

Pathology

Pathology of inflammatory disease, degenerative and neoplastic disease of vulva, vagina, cervix and uterus, fallopian tubes, ovaries and broad ligament.

Haematology

Blood groups, Rh factor, incompatibility, blood transfusion.

Biochemistry

Steroid and prostaglandin synthesis and metabolism in mother and foetus. Maternal and fetal carbohydrate, lipid, amino-acid metabolism and iron metabolism. Synthesis and secretion of fetal pulmonary surfactant.

Endocrinology

Structure, synthesis, function, metabolism and principles of assay of hormones, produced from hypothalamus, Anterior and posterior pituitary, Thyroid, Pancreas, Adrenal cortex, adrenal medulla, Ovary, Testis and placenta.

Pharmacology

Placental transfer of drugs and its effects on mother and foetus, Eg: Antibiotics, anti hypertensives, Psychotropic drugs, Oral contraceptives, Chemotherapeutic drugs, Anticonvulsants, Anti coagulants and Oxytocic drugs, effects of tobacco and alcohol on pregnant mother and foetus. Teratogenic effect of drugs taken during lactational period.

Immunology

Basic immunology including primary and secondary immune response, mechanism of antibody production.HLA system and graft rejection. Change in pregnancy and the foetus as a graft. Immunological pregnancy tests.Rhesus and other Isoimmunisation.Active and passive immunization and Auto immune disease.

Microbiology

Epidemiology and pathophysiology of disease developing in pregnancy that is Septic abortion, Preterm labour, PROM, Puerperal sepsis, Mastitis, Septic shock and Neonatal sepsis. **Microbiology of TORCH infection, Syphilis, Chlamydia, Mycoplasma, hepatitis and HIV.**

Paper - II Obstetrics (Course Code U19MSOB02)

CO1 : Complete knowledge of physiological changes in pregnancy &labour, diagnosis of pregnancy, conduct & management of normal pregnancies

CO2 : Deal with general principles, protocols, practical problems in managing "High risk" pregnancies, secondary to maternal diseases like Diabetes, Hypertension, Liver diseases, Renal diseases, Endocrine disorders, Autoimmune disorders, Isoimmunisation& Post transplant situations

CO2 : Deal with general principles, protocols, practical problems in managing "High risk" pregnancies, secondary to fetal malformations, hydrops, Intrauterine fetal demise, multiple pregnancy.

CO4 : Role as a "Laborist" Triaging & Managing Emergency situations like Cord prolapse, Abruptio, Postpartum hemorrhage.

CO5 : Acquisition of minor & major surgical skills in obstetrical care - Suction evacuations, Dilatation & curettage, cerclages, instrumental deliveries & caesarian sections.

Maternal physiological changes during pregnancy

- Fluid and electrolyte balance.
- Changes in respiratory, Cardio vascular system.
- Changes in Gastro-intestinal system – including liver and pancreas.
- Change in urinary system.
- Hematological changes including coagulation mechanism and fibrinolytic system.

Teratology

Mechanism of teratogenesis. **Effect of possible teratogens- drugs virus radiation and other agents.**

Teratogenic plants

Antenatal care

Includes diagnosis of pregnancy, identification of high maternal and fetal complications and identification of high risk mothers and fetuses with appropriate modalities of investigation, advice to the expectant mothers regarding diet, exercise, immunization, warning symptoms of complications and educate her to prepare herself for normal delivery. Monitoring of fetal and maternal well-being and selection of place of delivery.

Physiology of Labour

- Causation of onsets of labour
- Intrapartum care
- Maternal and foetal monitoring
- Mechanism and management of normal labour.
- Fourth stage

Abnormal Pregnancy

- Medical disorders complicating pregnancy and childbirth.
- Obstetric complications.
- Multifetal pregnancy
- Superfecundation
- Repeated pregnancy loss
- Trophoblastic diseases
- Congenital malformations
- Ectopic pregnancy
- Foetal growth restriction
- Foetalmacrosomia
- PPRM and preterm labour
- Prolonged pregnancy
- Malpositions and presentations
- Abnormalities of placenta, membranes and umbilical cord
- Rh incompatibility
- Shock and collapse

Labour and delivery

- Induction of labour
- Active management of labour
- Intrapartum Surveillance of fetal and maternal well being.
- **Assessment of pelvis and cephalo-pelvic disproportion**
- Active management of third stage of labour.

Abnormalities of labour and delivery

- Prolonged labour
- Abnormal uterine action

- Post-partum haemorrhage
- Retained placenta
- Postpartum shock and collapse

Puerperium

- Physiology of normal puerperium
- Complications of puerperium including puerperal sepsis

Perinatology

The term new born infant

Low birth weight baby, - Preterm, - IUGR

Asphyxia neonatorum

Respiratory distress

Jaundice in new born

Haemorrhagic disease of newborn

Convulsions in newborn

Injuries of the newborn

Infection of newborn

Diarrhea in newborn

Vomiting of the newborn

Congenital malformation of newborn.

Neonatology

Early neonatal complication, infection and management.

Mortality and morbidity:

Epidemiology, Magnitude of the problem, causes, prevention and management of

Maternal mortality and morbidity. Perinatal mortality.

Paper - III Gynaecology(Course Code:U19MSOB03)

CO1: Enumerating, Classifying, Diagnosing& managing common gynecological problems

CO2 : Understanding Medical & surgical management of gynec conditions. Prescription writing for common gynecological conditions.

CO3 : Performing Gynecological office procedures like PAP smear, HPV DNA testing, Pipelle sampling, Intrauterine device insertions, Pessary insertion/removal & Interpreting histopathological reports.

CO4 : Knowledge of Basics of Infertility &Gynec.Oncology

CO5 : Acquiring minor / major surgical skills in Gynecology - D & C, Endometrial aspirations, Pollectomy, tubal sterilisation, ovarian cystectomy, myomectomy, hysterectomy

Gynaecology

History taking with special reference to Gynaecological history, abdominal and pelvic examination, relevant investigation to arrive at most probable diagnosis.

Topics includes: Infection, Newgrowths (both benign and malignant) and other pathological disorders of vulva, vagina, urinary bladder, cervix, uterus, fallopian tubes, Ovaries and Pelvic cellular tissues including pelvic organ prolapse, STD and HIV.

Adolescent Gynaecology

Menstrual disorders, including amenorrhoea, menopause, postmenopausal

Gynaecological problems and management of the aged and elderly women.

Chromosomal disorders – including intersex.

Underdeveloped secondary sexual characteristics and gynecology

Gynaecologic clinical cytopathology.

Contraception and family planning

Infertility and ART

Tubal patency testing

Hormones therapy.

Problem of sex and marriage.

Pelvic assessment

- To work in O.P.D and examine Gynaecology cases routinely.
- Minor operations: To assist in the beginning and carry out work independently by the end of I year.
- Major Operations: **To assist as second assistant for the I six months and as first assistant for the next 6 months and do major operations like vaginal hysterectomy with P.F.R. and abdominal hysterectomy, Ovariotomy** with the assistance of senior doctors. By the end the course the candidate shall be familiar with the techniques of above mentioned operations and to do independently.
- **To do investigations like HSG and USG under guidance initially and independently by the end of course.**
- Management of pelvic inflammatory diseases including TB of the pelvis
- To assist medico legal cases.
- Writing case records.
- Candidate should write separate PG case sheets, They should keep diary and log book and get verified by the Unit Chief by the end of each month.

Paper - IV Social Obstetrics and Family Welfare Planning (Course Code U19MSOB04)

CO1: Implementing National health & family welfare programmes

CO2 : Population based interventional approach to common disease conditions

CO3 : Updating on the recent advances in Obstetric &Gynecpractise

CO4 :Practise family planning methods

CO5 :Analysing& reporting Maternal & perinatal morbidity & mortality in the region of practise

Social obstetrics

Study of interplay of social and environmental factors and human reproduction going back to premarital a preconception period.

- Implementing safe motherhood initiative
- Community maternal health care
- Antenatal checkup
- MCH problems
- **Risk approach of pregnant women – Anaemia, STD syphilis, tetanus, AIDS.**
- Domiciliary care
- Postnatal complications
- Low birth weight (L.B.W)
- Socio economic status and birth weight correction
- Infant feeding
- Road to health chart and school health programme
- Pre pregnancy and post pregnancy counseling
- Reproductive and child health (RCH)
- National Health programmes

Family welfare programmes including Reconstructive surgeries.

Temporary methods:

Chemical contraceptives

Barrier methods

Hormonal and non- hormonal contraception

IUD

Permanent methods:

Tubectomy – postpartum and concurrent

Laparoscopic tubal ligation

Minilap

Vasectomy

Reconstructive surgeries

Tuboplasty

Vasovasostomy

Medical termination of pregnancy

MTP Act

1st and 2nd Trimester MTP

Soft Skills- U19MSOB05- Elective Course

CO1: Research Methodology knowledge

CO2: Communication skills with patients and caregivers.

CO3: Ability to work as a member of a healthcare team.

CO4: Attitude towards constantly updating subject knowledge and skills.

Scheme of Examination

A. Theory

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows:

Paper I: Basic Science as applicable to Obstetrics and Gynaecology

Paper II: Obstetrics

Paper III: Gynaecology

Paper IV: Social Obstetrics and Family Welfare Planning.

Note: The distribution of chapters/ topics shown against the papers are suggestive only.

B.Clinical 200marks

There shall be two long cases and two short cases to be examined and presented by each candidate. Marks shall be 200.

Type of cases:

Long cases: One case of Obstetrics and one case of Gynaecology. Each case carries 75 marks.

Short Case: One case of Obstetrics and one case of Gynaecology. Each case carries 25 marks.

C.Viva Voce: 100 marks.

1.Viva Voce Examination: 80 marks.

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition candidates may be also be given case reports, charts, dummies (pelvis, foetal skull), gross specimens, pathology slides, instruments, X-rays, ultrasound, CT scan images, NST etc., for interpretation. It includes discussion on dissertation also.

2.Pedagogy Exercise: 20 marks.

A topic be given to each candidate in the beginning of clinical examination. He/She is asked to make a presentation on the topic for 8-10 minutes.

D.Maximum marks for M.D.Obstetrics and Gynaecology:

Theory	Practical	Viva	Grand Total
400	200	100	700



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program MS Ophthalmology

Goal:

The Master's Course in Ophthalmology is a 3-year integrated course, after satisfactory completion of which the candidate shall be able to practice ophthalmology competently and safely in the community that he/she serves

Objectives of the course:

With the knowledge and skills developed at the completion of the course, the candidate shall be able to:

1. offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, for common as well as referred conditions.
2. periodically self assess his or her performance and keep abreast with ongoing advances in the field and apply the same in his/her practice.
3. be aware of his or her own limitations to the application of the specialty in situations which warrant referral to major centers or individuals more qualified to treat.
4. apply research and epidemiological methods during his/ her practice. The candidate shall be able to present or publish work done by him/ her.
5. contribute as an individual/ or in a group or institution towards the fulfillment of national objectives with to prevention of blindness.
6. effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.
7. effectively communicate with colleagues.

Program Outcomes

PO1 Offer to the community, the current quality of 'standard of care' in ophthalmic diagnosis as well as therapeutics, medical or surgical, for common as well as referred conditions.

PO2 Utilize the knowledge and skills acquired in allied specialties such as Pathology, Microbiology, neuromedicine, ENT.

PO3 Undertake ocular eye disease diagnostic responsibilities and participate in the management processes

PO4 Keep himself/herself abreast of all recent developments and emerging trends in the field of Ophthalmology

PO5 Evaluate his/her professional activities, educational needs and select appropriate learning resources periodically.

PO6 Deal with general principles and practical problems related to clinical ophthalmology

PO7 Utilize the knowledge and skills acquired from various subspecialties like Retina, clinic, Glaucoma clinic, Cornea clinic, Neuro ophthalmology clinic, Uvea clinic and pediatric ophthalmology clinic .

PO8 Be aware of his or her own limitations to the application of the specialty in situations which warrant referral to major centers or individuals more qualified to treat.

PO9 contribute as an individual/ or in a group or institution towards the fulfillment of national objectives with to prevention of blindness.

PO10 effectively communicate with patients or relatives so as to educate them sufficiently and give them the full benefit of informed consent to treatment and ensure compliance.

PO11 effectively communicate with colleagues.

Program Specific Outcomes

PSO1 Perform Cataract surgery independently, including working up of the patient(IOL power calculation).

PSO2 Perform Objective and Subjective Refraction and dispense spectacle prescription.

PSO3 Assist in various ophthalmic surgeries like Trabeculectomy, Retinal detachment surgery, Strabismus surgery, Keratoplasty and various oculoplasty procedures.

PSO4 Perform daily Out patient services including patient screening and disease determination.

PSO5 Perform OPD investigative tests like HFA, OCT(AS and retinal), B scan, A scan, Keratometry, FFA, Corneal Topography, Specular microscopy.

PSO6 Perform independently minor ocular procedures like Chalazion I and C, Abscess Drainage, NLD probing and syringing.

PSO7 Perform independently or with assistance ocular surgeries like pterygium surgery, Primary repair of the ocular injuries, tarsoraphy.

PSO8 Participate in community out reach activities like camps, school screening and public education.

PSO9 Participate in department research activities.

PSO10 Prescribe medications for various ailments and follow up patients to understand outcomes.

PSO11 Present original research article in state conference/National/international conference.

PSO12 To do thesis work in the field of ophthalmology under guidance of senior faculty.

PSO13 Teach junior post graduates, undergraduates and optometry students about ophthalmology and optometry.

Course Contents

Essential theoretical knowledge

These are only broad guidelines and are illustrative; there may be overlap between sections.

The Basic Sciences:

1. Orbital and Ocular anatomy
 - a. Gross anatomy
 - b. Histology
2. Ocular Physiology
 - a. Pathology
3. Ocular pathology:
 - a. Gross pathology
 - b. Histopathology.
4. Biochemistry
 - a. General biochemistry,
 - b. Biochemistry applicable to ocular function.
5. Microbiology
 - a. Specific microbiology applicable to the eye
 - b. Immunology with particular reference to ocular immunology
6. Geometric and ophthalmic optics
 - a. Basic physical optics
 - b. Ophthalmic optics
 - c. Applied optics including optical devices
7. Clinical Ophthalmology
 - a. Disorders of Refraction
 - b. Disorders of the Lids
 - c. Disorders of the Lacrimal System
 - d. Disorders of the Conjunctiva
 - e. Disorders of the Sclera
 - f. Disorders of the Cornea
 - g. Disorders of the Uveal Tract
 - h. Disorders of the Lens
 - i. Disorders of the Retina
 - j. Disorders of the Optic Nerve & Visual Pathway

- k. Disorders of the Orbit
- l. Glaucoma
- m. Neuroophthalmology
- n. Paediatric ophthalmology
- o. Systemic ophthalmology (Ocular involvement in systemic disease)
- p. Immune ocular disorders
- q. Strabismus & Amblyopia

Essential diagnostic skills – Instrumentation

Tonometry

- 1. Applanation
- 2. Indentation (commonly Schiotz)

Assessment of Epiphora

- 1. Jone's dye test
- 2. Syringing – performance & interpretation

Dry eye evaluation

- 1. Schirmer test
- 2. Rose Bengal staining
- 3. Tear film breakup time
- 4. Tear meniscus evaluation

Corneal ulceration

- 1. Taking a corneal scraping
- 2. Inoculation into media
- 3. Evaluation of Gram's stain
- 4. Evaluation of KOH preparation
- 5. Corneal wedge biopsy

Direct ophthalmoscopy

- 1. Distant direct
- 2. Media assessment
- 3. Use of filters provided

Indirect ophthalmoscopy

1. Scleral depression
2. Fundus drawing capability
3. Use of filters provided

Slit Lamp Examination

1. Diffuse examination
2. Focal examination
3. Retroillumination – direct & indirect
4. Sclerotic scatter
5. Specular reflection
6. Staining modalities and interpretation

Slit Lamp Accessories

1. Applanation Tonometry
 - a. Goldman's applanation
2. Gonioscopy
 - a. Grading of the angle
 - b. Testing for occludability
 - c. Indentation gonioscopy
3. 3-mirror examination of the fundus
4. 78-D / 90-D / examination
5. Optical Pachymetry
6. Slit lamp photography

Colour vision evaluation

1. Ishihara pseudoisochromatic plates
2. Other tests including
 - a. Farnsworth – Munsell 100 – hue or 15 – hue tests
 - b. Holmgren's wols
 - c. Edridge – Green lantern

Use of Amsler's charting

1. Instructing in the use of and interpreting the chart

Corneal topography and corneal mapping

1. Interpretation of corneal topography mapping

Specular microscopy of the corneal endothelium

Keratometry

1. Performance & interpretation of keratometry
2. Diagnosis of situations such as keratoconus

Fundus photography & fundus fluorescein angiography (FFA, FAG)

1. Doing and evaluating stereoscopic fundus photographs
2. Performance of and interpretation of FFA
3. Performance of indirect fluorescein angiography
4. Autofluorescence
5. Optical Coherence Tomography

Refraction

1. Retinoscopy
2. Streak Retinoscopy
3. Use of trial set
4. Use of Jackson's cross-cylinder
5. Subjective and objective refraction
6. Prescription of glasses for all types of refractive errors
7. Knowledge of manufacture, fitting & dispensing of glasses

Autorefractometry

1. Use of and interpretation of autorefractometer

Diagnosis & assessment of Squint

1. Ocular position and motility examination
2. Versions, ductions and vergences
3. Convergence facility estimation
4. Cover/ Uncover/ Alternate cover test
5. Use of prism bars or free prisms in assessment of squint
6. Use of Synaptophore
7. Use of Bagolini's striated glasses / red filters / Maddox rod
8. Use of Worth's four dot test
9. Use & interpretation of the Hess chart / Lees' screen
10. Performance & interpretation of diplopia charting
11. Diagnosis of amblyopia

Exophthalmometry

1. Use of Hertel's exophthalmometer

2. Use of Luedde's exophthalmometer
3. Use of other exophthalmometers
4. Measurement of **proptosis or Exophthalmos**

Use and evaluation of ophthalmic ultrasound

1. A-scan ultrasound with biometry
2. **B-scan ultrasound : performance & interpretation**

Interpretation of perimetry

1. Tangent screening
2. Goldman perimeter & interpretation
3. Static computerized perimetry
 - a. Interpretation of common field defects

Radiology

1. Interpretation of plain skull films

- a. PA-20 (Caldwell's view)
- b. PNS (Water's view)
- c. Lateral
- d. Submentovertical
- e. Optic canal views
- f. Localisation of intra ocular and intra orbital FBs

2. Interpretations of contrast studies

- a. Performance & interpretation of dacryocystograms
- b. Performance and interpretations of orbital venograms
- c. Interpretation of carotid angiograms

3. Interpretation of CT –Scan & MRI Scans

- a. Orbital CT interpretation & orbital MRI evaluation
- b. Brain CT interpretation

4. Understanding of current techniques & specialized investigations

- a. OCT
- b. UBM
- c. ERG / VEP

Essential surgical skills

Procedure	Nature of activity * & number			
	O	A	PA	PI
1. Operating theatre				
a. Anaesthesia:				
i. Peribulbar anaesthesia	-	-	-	-
ii. Parabulbar anaesthesia		-	-	-
iii. Facial blocks				
• O'Brein	-	-	-	
• Van Lint & modifications	-	-	-	
iv. Frontal blocks	-	-	-	
v. Infra orbital blocks	-	-	-	
vi. Blocks for sac surgery	-	-	-	
b. Magnification:				
i. Operating microscope: Familiarity with use is essential	-	-	-	
ii. Operating loupe				
c. Lid surgery:				
i. Tarsorrhaphy	-	-	-	-
ii. Ectropion and Entropion procedures	-	-	-	-
iii. Ptosis surgery	-	-	-	-
iv. Lid repair following trauma and surgical excision of lid for tumours etc.	-	-	-	-
v. Epilation, electrolysis, cryotherapy etc.	-	-	-	-
d. Destructive procedures:				
i. Evisceration with or without implant				
ii. Enucleation with or without implant				
iii. Modified enucleation procedures for intraocular tumours				
e. Sac surgery				
i. Dacryocystectomy	-	-	-	-
ii. Dacryocystorhinostomy	-	-	-	-
iii. Probing for congenital obstruction	-	-	-	-

of nasolacrimal duct				
Procedure	Nature of activity * & number			
	O	A	PA	PI
f. Extraocular muscle surgery				
i. Recession and resection procedures on the horizontal recti	-	-	-	-
g. Cataract surgery				
i. Standard ECCE with or without IOL implantation – Cataract –surgery	-	-	-	-
ii. Small incision ECCE with or without IOL implantation				
iii. Secondary AC or PCIOL implantation				
iv. Phacoemulsification				
v. Intra capsular cataract extraction				
h. Retinal surgery				
i. Needs to know to assist in external procedures such as buckling	-	-	-	-
ii. Prophylactic cryotherapy	-	-	-	-
i. Orbit surgery				
i. Anterior orbitotomy for diagnostics and therapy	-	-	-	-
ii. Lateral orbitotomy for tumours		-	-	-
iii. Incision and drainage via anterior orbitotomy for abscess	-	-	-	-
iv. Exenteration		-	-	-
v. Fine needle aspiration biopsy of orbital disease		-	-	-

j. Vitrectomy				
i. Intra vitreal and intra cameral (anterior chamber) injection techniques and dosages, particularly for endophthalmitis management.	-	-	-	-
ii. Needs to know the basics of open sky vitrectomy (anterior segment as management of cataract surgery complication	-	-	-	-
Procedure	Nature of activity * & number			
	O	A	PA	PI
iv. Assist vitrectomy surgeon if facility exists				
k. Keratoplasty				
i. Assisting or doing penetrating keratoplasty (therapeutic, optical)	-	-	-	-
ii. Lamellar keratectomy		-	-	-
i. Glaucoma surgery				
i. Trabeculectomy	-	-	-	-
ii. Trabeculectomy				
iii. Goniotomy				
iv. Cyclocryotherapy and other cyclodestructive procedures	-	-	-	-
m. Surface ocular procedures				
i. Pterygium excision with modifications	-	-	-	-
ii. Conjunctival grafting	-	-	-	-
iii. Biopsy of cornea and conjunctiva	-	-	-	-
iv. Amniotic membrane grafting	-	-	-	-

Procedure	Nature of activity * & number			
	O	A	PA	PI
2. Outpatient:				
a. Manual diagnostic procedures such as syringing, corneal scraping, conjunctival swab collection, conjunctival scraping etc.	-	-	-	-
b. Conjunctival and corneal foreign body removal on the slit lamp	-	-	-	-
c. Chalazion incision and curettage	-	-	-	-
d. Biopsy of small lid and tumours	-	-	3	-
e. Suture removal skin, conjunctival, corneal and corneoscleral	-	-	-	-
f. Subconjunctival injection	-	-	-	-
g. Posterior sub-Tenon's injection	-	-	-	-
h. Artificial eye fitting	-	-	-	-
i. Laser procedures		-	-	-
i. Laser Capsulotomy		-	-	-
ii. Laser iridotomy		-	-	-
iii. Laser trabeculoplasty		-	-	-
iv. Panretinal photocoagulation		-	-	-
v. Focal photocoagulation		-	-	-

* The procedures that the student should have:

O = Washed and observed

A = Assisted the operating surgeon

PA = Performed with Assistance

PI = Performed Independently

Essential Research Skills

1. Basic statistical knowledge

- a. Ability to undertake clinical & basic research
 - b. Descriptive and Inferential statistics
 - c. Ability to publish results of one's work
2. Ability to constructively criticize publications in the field and without
 3. This could be achieved during the course by attending regularly journal clubs etc where selected articles could be taken and evaluated for content quality and presentation.

Other skills required

1. Contact lenses
 - a. Assessment
 - b. RGP fitting
 - c. Soft lens fitting
2. Low vision aids
 - a. The basics of fitting with knowledge of availability & cost
3. Community ophthalmology
 - a. Ability to organize institutional screening
 - b. Ability to organize peripheral eye screening camps
 - c. Knowledge and ability to execute guidelines of National Program for Prevention of Blindness
4. Presentation
 - a. Ability to present one's work effectively at various scientific for a particularly free papers in scientific conferences within allotted framework of time.
5. Organisation
 - a. Ability to organize meetings, seminars and symposia
 - b. Ability to get along with colleagues and work as a team with the other members of the department.
 - c. Ability to interact with and work as a team with other disciplines that may exist in the same hospital.
6. Communication skills
 - a. With patients
 - b. With colleagues
7. Record keeping
 - a. The ability to maintain record as scientifically as possible
 - b. Knowledge of computer software is helpful
8. Teaching
 - a. The ability to pass on skills acquired to one's juniors, theoretical, procedural and surgical

Year – wise structured training schedule

First year:

1. Log Book

2. Theoretical knowledge

- a. Basic science should be addressed during this period
- b. It is useful to have an internal examination of the basic sciences at the end of the first year, which will decide appearance at the final examination.
- c. Clinical ophthalmology

3. Clinical examination and diagnostics

- a. The basic of history taking, order and correct methods of examination and recording have to be learnt during this time.
- b. Clinical and surgical decision making is encouraged under supervision.

4. Diagnostics

- a. All procedures in bold should as far as possible be done and the student should be fairly conversant with most of the techniques marked in bold.

5. Surgery

- a. Extra ocular surgery including
 - i. Destructive procedures must have been done independently with or without assistance
 - ii. Local Anaesthesia (retrobulbar and peribulbar blocks)
 - iii. Subconjunctival injections
 - iv. Assisting for squint surgery
 - v. Assisting for lid surgery. Tarsorrhaphy should be performed independently as also the simpler oculoplastic procedures.
 - vi. Chalazion and Pterygium surgery
 - vii. Lid and corneal foreign body removal, suture removal on the slit lamp etc.
 - viii. At the end of the first year, the student should have participated as assistant in most of the intra ocular procedures as an assistant.
 - ix. Cataract surgery:
 - Cataract surgery should be approached in stages, emphasis to be given on microscopic surgery
 - At the end of the first year, the student should be able to do standard extracapsular cataract extraction at least under guidance.

Second year:

1. Theoretical knowledge:

- a. Stress will be laid on clinical ophthalmology

2. Clinical examination and diagnostics

- a. The student is encouraged to take diagnostic investigational and therapeutic decisions on his/ own. He/ she should be able to manage most of the common problems that arise without guidance. However, the degree of freedom allowed in decision making is left to the confidence of the teacher in the student's abilities. It is to be encouraged. May require guidance for more complex cases.

3. Diagnostics

- a. The student should be conversant and at ease with most if not all the diagnostic procedures outlined in bold. Other procedures are optional skills if facility is available in the department. This is particularly so for the Master's candidate. However, as far as possible, it is advisable to make all such facility available in the department.

4. Surgical skills

- a. At the end of the second year, the student should be capable of operating, without assistance, but under supervision, all varieties of cataract except congenital cataract. He/ she should also know the management of cataract induced complications and cataract surgical complications (management of vitreous loss).
- b. He/ she should have performed the basic antiglaucoma procedures such as trabeculectomy either with assistance or under supervision.
- c. Extra ocular surgery such as squint surgery could be performed with assistance.
- d. In addition, Lacrimal sac surgery such as dacryocystectomy and dacryocystorhinostomy should be possible with assistance or under supervision.
- e. In addition, the Master's candidate should ideally have assisted in the other surgery such as retinal surgery, vitrectomy, orbit surgery, advanced oculoplastic surgery etc.

5. Conferences and workshops

- a. The candidate should have attended one or two regional workshops and one national conference if possible. Presentation of a free paper at these venues is to be encouraged.

6. Submission of Log Book at the end of 2nd year

Third year:**1. Theoretical knowledge:**

- a. Should be thorough with basic clinical ophthalmology with extensive and intensive reading.

2. Clinical examination and diagnostics

- a. Should be conversant with all aspects of clinical examination and decision making. Independent decision making and investigational and management freedom should be given at this stage for the more usual situations. However, complex cases could be discussed with consultant and degree of freedom of decision making is left to the consultant's discretion.

3. Surgical skills

- a. Routine skills are honed during this period
- b. Cataract surgery should be done independently without supervision or assistance.
- c. Antiglaucoma surgery may be done.
- d. Can assist other procedures such as Retinal surgery, orbit surgery etc. The choice of doing the surgery with assistance and supervision should be left to the discretion of the consultant.

4. Conferences and workshops

- a. The candidate by this time should have attended at least one national conference. He/ she should be given time off to attend regional workshops and conferences particularly those dealing with the state of art.

Rotation and Posting in other Departments

In institutions where subspecialties are not being usually performed. (eg. VR surgery, orbit surgery etc.), students could be deputed for a month or so in institutions in which these specialties are highly developed.

For an MS student, optional rotation postings to allied departments would include

Plastic Surgery

Neurology / Neurosurgery

Intensive Care

ENT

However, posting to these allied specialties would depend upon the head of department's discretion. The total duration of posting should not exceed 4 months.

Teaching - Learning Activities**1. Clinical Case discussions**

- a. Every effort should be made to include as wide a variety of cases as possible over two years with multiple repetitions.

- b. Case discussions on the patient's records written by the student is to be encouraged as it helps exercise the student's diagnostic and decision making skills.
- c. Case presentation at other in-hospital multidisciplinary forum may be done.

2. Seminars

- a. Seminars should be conducted at least once weekly. The topics selected should be repeated once in 2 years so as to cover as wide a range of topics as possible.
- b. Seminars could be individual presentations or a continuum (large topic) with many candidates participating.
- c. Each candidate shall present at least four seminar a year and a total of 12 seminars in 3 years

3. Journal Clubs

- a. This also should be a once a week or once in two week exercise. The topics selected should be current. It could be done topic wise or journal wise. Indexed journals are recommended
- b. Each candidate shall present journal allotted at least four times in a year and a total of 12 such presentations be made in 3 years

4. CPC

Clinico pathological exercises (CPCs), are useful and should be done.

5. Lectures

- a. Lectures to candidates should be in the form of instructional course at the beginning of the academic term. These would include topics such as dark room techniques, fundus fluorescein angiography, evaluation of perimetry, squint evaluation and management, slit lamp examination with accessories such as gonioscopy etc.
- b. Lectures could also be arranged round the year on subspecialty topics.
- c. During the course, the candidates should have one lecture / one seminar on National programs (eg.National Programme for Control of Blindness, Trachoma program etc.), International assistance schemes for execution of national program (DAN-PCB, Lion's International, Christoffel-Blinden Mission etc). These would be addressed to include a few lectures on other non-ophthalmic National programs being undertaken in the country.

6. Research Activities

A candidate should learn to be conversant with journal browsing, medline search etc. to help in project and clinical and research work.

7. Dissertation & research meetings:

Departmental meetings should be held to overview research work done particularly satisfactory conduct and progress of dissertation topics. These could be conducted once in 3 months either as an additional activity or in lieu of a journal club.

8. Teaching skills:

Every postgraduate student should be involved in undergraduate teaching also. One or two theory classes for undergraduates could be attended and one or two theory classes could be taken for undergraduates for selected topics. Undergraduate clinical teaching is another teaching skill that the student should pick up during one course. At least five to six undergraduate clinical classes should be taken by the final year student (MS) before his/ her course is over. This may be supervised by a consultant if necessary.

9. Orientation program:

All postgraduates from all specialties should have an introductory program in the institution where they are informed about candidate responsibilities, working systems, library usage, lab protocols etc.

Specific orientation regarding the departmental working could be made as an introductory talk in the department concerned.

10. Dissertation or Thesis:

1. The dissertation is aimed to train a postgraduate student in research methods and techniques. It includes identification of problem, formulation of a hypothesis, search and review of literature getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions. PG students should maintain a log book (rough) from first day and it should be verified in every one or two months. Thesis should be submitted at the end of the second year and it is extendable to 6 more months (ie., upto 2 ½ years)
2. Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University.
3. Such synopsis will be reviewed and the dissertation topic will be registered by the University. No changes in the dissertation topic or guide shall be made without prior approval of the University.
4. The dissertation should be written under the following headings:
 - i. Introduction
 - ii. Aims or Objectives of study
 - iii. Review of Literature
 - iv. Material and Methods
 - v. Results
 - vi. Discussion
 - vii. Conclusion
 - viii. Summary
 - ix. References

- x. Tables
- xi. Annexure

5. The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other Checklists. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.
6. Four copies of dissertation thus prepared shall be submitted to the University, six months before final examination on or before the dates notified by the University.
7. The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.
8. **Guide:** The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work shall be as per Medical Council of India Minimum Qualifications for Teachers in Medical Institutions regulations, 1998. Teachers in a medical college/ institution having a total of eight years teaching experience out of which at least five years teaching experience as Lecturer or Assistant Professor gained after obtaining postgraduate degree, shall be recognized as postgraduate teachers.

A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/ training by the University/ Medical Council of India. The co-guide shall be a recognized postgraduate teacher.
7. **Change of guide:** In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

Monitoring of teaching and learning activities

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching/ learning activities. It may be structured and assessment be done using checklist that assess various aspects.

The learning outcomes to be assessed should include: (i) Personal Attitudes, (ii) Acquisition of Knowledge, (iii) Clinical and operative skills, (iv) Teaching skills and (v) Dissertation.

- i) **Personal Attitudes.** The essential items are:
- Caring attitudes
 - Initiative
 - Organisation ability
 - Potential to cope with stressful situations and undertake responsibility
 - Trust worthiness and reliability
 - To understand and communicate intelligibly with patients and others
 - To behave in a manner which establishes professional relationships with patients and colleagues
 - Ability to work in team
 - A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

ii) **Clinical skills**

Day to Day work : Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills

Clinical meetings : Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list

Clinical and Procedural skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

iv) **Teaching skills:** Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students

(v) **Acquisition of knowledge:** The methods used comprise of 'Log book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

(vi) **Work diary / Log book** – Every candidate shall maintain a work diary and record his/ her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the

Department and Head of the Institution, and presented in the university practical / clinical examination.

(vii) Periodic tests: The departments may conduct three test, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinicals and viva voce.

Scheme of examination:

1. Theory (Written)

There shall be four question papers, each of three hours duration, carrying 100 marks. Each paper shall consist of two long essay questions each carrying 20 marks and six short essay type of questions each carrying 10 marks.

Details of distribution of topics for each paper will be as follows:

Paper I: I Basic & Applied Sciences (Course Code: U19MSOP01)

CO1: Knowledge of the Anatomy of the eye & orbit

CO2: Knowledge about Ocular physiology

CO3: Knowledge about Ophthalmic pathology

CO4: Knowledge about Microbiology & Immunology
Biochemistry relevant to ophthalmology

CO5: Knowledge about Geometric and ophthalmic optics

The Basic Sciences:

1. Orbital and Ocular anatomy

- a. Gross anatomy
- b. Histology

2. Ocular Physiology

- a. Pathology

3. Ocular pathology:

- a. **Gross pathology**
- b. Histopathology.

4. Biochemistry

- a. General biochemistry,
- b. **Biochemistry applicable to ocular function.**

5. Microbiology

- a. Specific microbiology applicable to the eye
- b. **Immunology with particular reference to ocular immunology**

Paper II: Optics and Refraction & Ophthalmic Medicine (Course Code: U19MSOP02)

CO1: Knowledge and skill in objective and Subjective Refraction

CO2: Knowledge about various instruments used in optometry

CO3: Knowledge and practical skill in Low vision aid and Contact lens

CO4: Knowledge about optics of various lenses and instruments used in ophthalmology

CO5: Knowledge about various ophthalmic medications there uses mechanism of actions and side effects.

Refraction

Retinoscopy

Streak Retinoscopy

Use of trial set

Use of Jackson's cross-cylinder

Subjective and objective refraction

Subjective refraction in pediatric age group

Prescription of glasses for all types of refractive errors

Use of amsler grid

Use of prism in analyzing squint

Knowledge of manufacture, fitting & dispensing of glasses

Autorefractometry

Use of and interpretation of autorefractometer

Geometric and ophthalmic optics

a. Basic physical optics

b. Ophthalmic optics

c. Applied optics including optical devices

Paper III: Clinical Ophthalmology (Course Code: U19MSOP03)

CO1: Theoretical and Practical knowledge of cataract and its management

CO2: Knowledge and diagnostic skill in Strabismus management. Knowledge about treatment for Strabismus and Amblyopia

CO3: Theoretical and Practical knowledge of glaucoma and its management

CO4: Knowledge about diseases on Sclera, Uvea, Retina and competence in managing them

CO5: Knowledge about Corneal and conjunctival diseases and competence in management

- a. Disorders of the Orbit
- b. Disorders of the Lids
- c. Disorders of the Lacrimal system
- d. Disorders of lens
- e. Disorders of Glaucoma
- f. Disorders of Retina
- g. Disorders of the Uvea
- h. Orbital tumours
- i. Ophthalmological manifestations of systemic diseases

Fundus photography & fundus fluorescein angiography (FFA, FAG)

Doing and evaluating stereoscopic fundus photographs

Performance of and interpretation of FFA

Performance of indirect fluorescein angioscopy

Autofluorescence

Optical Coherence Tomography

Tonometry

Applanation

Indentation (commonly Schiotz)

Assessment of Epiphora

Jone's dye test

Syringing – performance & interpretation

Dry eye evaluation

Schirmer test

Rose Bengal staining

Tear film breakup time

Tear meniscus evaluation

Corneal ulceration

Taking a corneal scraping

Inoculation into media

Evaluation of Gram's stain

Evaluation of KOH preparation

Corneal wedge biopsy

Direct ophthalmoscopy

Distant direct
Media assessment
Use of filters provided

Indirect ophthalmoscopy

Scleral depression
Fundus drawing capability

Diagnosis & assessment of Squint

Ocular position and motility examination
Versions, ductions and vergences
Convergence facility estimation
Cover/ Uncover/ Alternate cover test
Use of prism bars or free prisms in assessment of squint
Use of Synaptophore
Use of Bagolini's striated glasses / red filters / Maddox rod
Use of Worth's four dot test
Use & interpretation of the Hess chart / Lees' screen
Performance & interpretation of diplopia charting
Diagnosis of amblyopia

Paper IV: Recent Advances (Course Code: U19MSOP04)

CO1: Updated Knowledge in Recent advances in Ophthalmic diagnostic modalities

CO2: Updated Knowledge in Recent advances in Ophthalmic surgeries

CO3: Knowledge about the recent published research papers in ophthalmology

CO4: Knowledge about newer ocular implants

CO5: Knowledge about latest Lasers and its various role in disease management in ophthalmology

- a. Recent Advances
- b. Systemic ophthalmology
- c. Community Ophthalmology
- d. Neuroophthalmology

Interpretation of plain skull films

PA-20 (Caldwell's view)

PNS (Water's view)

Lateral
Submentovertical
Optic canal views
Localisation of intra ocular and intra orbital FBs

Interpretations of contrast studies

Performance & interpretation of dacryocystograms
Performance and interpretations of orbital venograms
Interpretation of carotid angiograms

Interpretation of CT –Scan & MRI Scans

Orbital CT interpretation & orbital MRI evaluation
Brain CT interpretation

Understanding of current techniques & specialized investigations

OCT
UBM
ERG / VEP

Soft Skills: (MSOP5) – Elective Course

CO1: Research Methodolgy knowledge
CO2: Communication skills with patients and caregivers.
CO3: Ability to work as a member of a healthcare team.
CO4: Attitude towards constantly updating subject knowledge and skills.

Note : The distribution of chapters / topics shown against the papers are suggestive only.

2. Clinical Examination : 200 marks

1. Long case:

- a. Duration : 45 minutes – 1 hour
- b. Marks : 50 marks
- c. Type of case :

- i. Neuro ophthalmology
- ii. Proptosis
- iii. Sclerokeratouveitis
- iv. Uveitis with complications
- v. Lens induced complications
- vi. Glaucoma

2. Short cases

- a. Two short cases of 25 marks each
- b. Duration: 10 minutes- 15 minutes

3. Fundus cases

- a. Two fundus cases
- b. Duration: 10 minutes – 15 minutes each
- c. Marks: 25 marks each
- d. Type of cases:
 - i. Rhegmatogenous retinal detachment
 - ii. Diabetic retinopathy, background & proliferative
 - iii. Vasculitis
 - iv. Tractional RD
 - v. Hypertensive retinopathy and combination of the same with DR
 - vi. Mass lesions
 - vii. High myopia with degeneration
 - viii. Coloboma choroids, simple or with detachment
 - ix. Posterior uveitis, Retinitis etc.
 - x. Pigmentary Retinopathy

4. Refraction:

- a. Two refraction cases of 25 marks each

3. Viva voce:

100 marks

- a. Students will be examined by all the examiners together about students comprehension of the components of course contents, analytical approach and interpretation of data. This section will carry 80 marks. The examination will include the following:

- b. Pedagogy Exercise: (20 Marks)

A topic be given to each candidate before the clinical examination. Each will make a presentation on the topic for 8 to 10 minutes.

- c. During the viva-voce discussion on dissertation may be held. No marks are assigned as it would have been evaluated separately.

4. Maximum marks

Theory	Practical	Viva	Grand Total
400	200	100	700

Recommended Books and Journals:

Recommended books:

1. Parson's Diseases of eye
2. Duane's System of Ophthalmology
3. Jakobiec Series
4. Peyman's Series
5. Pathology gross specimens Duke-Elder's System of Ophthalmology
6. American Academy Series
7. Podos & Yanoff Series
8. Jack Kanski: Clinical Ophthalmology
9. Cornea:
 - a. Smolin & Thoft
 - b. Grayson
 - c. Kaufman & Leibowitz
10. Glaucoma
 - a. Bruce Shields Text Book of Glaucoma
 - b. Krupin & Shields Series on Glaucoma
 - c. Becker & Schaeffer's Text Book of Glaucoma
 - d. Anderson's Computerised Perimetry
 - e. Harrington's Text Book of Perimetry
 - f. Leiberman and Drake: Computerised perimetry
11. Retinal disease:
 - a. Stephen Ryan's Retina
 - b. Ron Michel: Retina; Detachment
 - c. Steve Charles: Basic Vitrectomy
12. Ultra Sound:
 - a. Sandra Byrne & Ronald Green: Ophthalmic Ultrasound
13. Uvea:
 - a. Nussenblatt & Palestine
 - b. Smith & Nozik
14. Neuroophthalmology:

- a. Walsh & Hoyt
- 15. Orbital disease:
 - a. Rootman's diseases of the orbit
 - b. Jakobiec & Snow – Diseases of the orbit
- 16. Tumours:
 - a. Jerry Shields – Diagnosis and management of orbital tumours
 - b. Jerry shields – Diagnosis and management of ocular tumours
- 17. Strabismus:
 - a. Gunter von Noorden
 - b. Mein & Trimble
- 18. Ophthalmic Pathology:
 - a. Yanoff & Fine
 - b. Zimmerman
- 19. Pharmacology:
 - a. Havener
- 20. Anatomy:
 - a. Wolff
 - b. Snell's
- 21. Physiology
 - a. Adler's Physiology of the eye
- 22. Biochemistry:
 - a. Standard text books
- 23. Immunology:
 - a. Ocular Immunology
- 24. Paediatric ophthalmology
 - a. Keeneth Wright
- 25. Refraction:
 - a. Duke Elder's practice of refraction
 - b. Elkington & Frank



**BHARATH INSTITUTE OF HIGHER EDUCATION
AND RESEARCH**

Program

MS Orthopedics

(Revised with effect from 2019-2020 onwards)

1. On successful completion of the training, the trainee must be able to provide state of art care to patients with musculoskeletal disorders.
2. The candidate must be able to evaluate and give Critical Care Services and emergency resuscitation for all cases of trauma.
3. Must be able to manage OP and ward patients and Orthopedics theatre work with full confidence and ability.
4. Must be able to teach undergraduates, and students of allied specialties.
5. Must be able to present and publish papers and be aware of research methodology.
6. The candidates must be able to communicate with patient and his/her family regarding the treatment and prognosis. Able to exercise empathy and care to the patients and must maintain higher ethical and moral values.
7. He should be aware of the recent advances and latest treatment in this specialty.
8. Must attend conferences and CME to improve his knowledge and learn newer techniques of treatment.
9. Must be able to work with team spirit with his seniors and colleagues and should maintain high human values.
10. In case of mass casualties and natural calamities must be able to put his entire ability to alleviate the sufferings of his patients.
11. Must participate in community health care activities as and when it is required and should participate in national health programmes.
12. Must be able to look after preventive, promotive, curative and rehabilitation aspects of all Orthopaedic conditions.

Program Outcomes

- PO 1 Accurate knowledge of musculoskeletal system including anatomy, Physiology, and biomechanics
- PO 2 General management of injuries including Emergency management , Investigations in definitive management and follow up
- PO3 Knowledge of injuries / Fractures specific to region , classification and application of the same in management
- PO4 Knowledge of nontraumatic Orthopaedic condition
- PO5 Basic knowledge in communication, Ethics and Medicolegal documentations
- PO6 To keep oneself abreast with current updates and advances in Orthopadics and traumatology

Program Specific Outcomes

- PSO 1 Application of this knowledge in diagnosis and Management of Orthopaedics condition

PSO 2 Ability to Identify the requirements and ability to set up a system where an individual with Trauma is successfully managed

PSO3 Ability to treat the Injury non operatively/ Operatively and to document , communicate the fellow team members managing the patient

PSO 4 Treatment of nontraumatic conditions as outpatients as well as in patients

PSO5 Communicating with patients and relatives and helping them in choosing the treatment options. Ethically conduct studies and also obtain informed consent when required.

PSO6 To search for current evidence and to formulate best practice guidelines in a research with aim to present and publish in scientific forum.

Syllabus

Basic Science

Anatomy :

- Clinical and functional anatomy with pathological and operative relevance
- Anatomy and embryology of nervous and vascular systems
- Surgical approaches to the limbs and axial skeleton
- Anatomy and embryology of musculoskeletal system
- Histology

Tissues :

- Bone – Structure
- Cartilage – articular, meniscal
- Structure & Function
- Muscle and tendon – Structure & Function
- Synovium – Structure & Function, synovial fluid analysis
- Ligament – Structure & Function, synovial fluid analysis
- Nerve - Structure & Function
- Intervertebral disc - Structure & Function

Physiology, Biochemistry & Genetics:

- Structure and function of connective tissues
- Application /relevance of modern genetics to orthopaedic disease and treatment
- Shock – types, physiology, recognition and treatment
- Metabolism and hormonal regulation of musculoskeletal system and other related orthopaedic physiology.
- Metabolic and immunological response to trauma, poly trauma and management.
- Blood loss in trauma/ surgery, fluid balance and blood transfusion

- Bone grafts, bone banking and tissue transplantation.

Pathology – General Pathology

- Tumour pathology in Musculoskeletal diseases.
- Other orthopaedic pathology.
- Gene therapy in Orthopaedic disorders, stem cells in Orthopaedic surgery

Biochemistry

- General biochemistry
- Biochemical aspects related to orthopaedic diseases

Biomechanics & Bioengineering:

- Biomechanics of musculoskeletal tissues
- Biomechanics of fracture fixation, fracture fixation in osteoporotic bones.
- Tribology of natural and artificial joints
- Design of implants and factors associated with implant failure (wear, loosening)
- Kinematics and gait analysis
- Biomaterials
- Bone grafting and bone substitutes.

Orthopaedic Oncology:

- Knowledge of the presentation, radiological features, pathological features, treatment and outcome for common benign and malignant tumours
- Understanding of the principles of management of patients with metastatic bone disease in terms of investigation, prophylactic and definitive fixation of pathological fractures and oncological management.
- Knowledge of the presenting features, management and outcome of soft tissue swellings, including sarcomas

General:

- Osteoarthritis
- Osteoporosis
- Metabolic bone disease
- Rheumatoid arthritis and other arthropathies (inflammatory, crystal, etc.)
- Hemophilia
- Inherited musculoskeletal disorders – Mucopolysaccharidosis and dysplasia of bone: epiphysis metaphysis, diaphysis, marrow and whole bones.
- Neuromuscular disorders – inherited and acquired
- Fluorosis

- Osteonecrosis
- Osteochondritides
- Heterotopic ossification
- Metastases
- Disaster management
- Management if war wounds & civil disturbance.

Investigations:

- Blood tests
- Musculoskeletal imaging/; x-ray, contrast studies (myelography, arthrography), CT, MR, ultrasound, radioisotope studies
- Effects of radiation
- Bone densitometry
- Electrophysiological investigations

Operative Topics

- Tourniquets
- Design of theatres
- Anaesthesia – principles and practice of local and regional anaesthesia and principles of general anaesthesia

Infection, Thromboembolism & Pain

- Infection of bone, joint, soft tissue, including tuberculosis, and prophylaxis
- Pyogenic osteomyelitis, bone & joint infection in brucellosis fungal infections, salmonella osteomyelitis, hydatid disease of the bone.
- Syphilitic affections of bone and joints – congenital acquired
- Surgical site infection, prevention and treatment.
- Sterilisation
- Thromboembolism and prophylaxis
- Behavioural dysfunction and somatization
- AIDS and surgery in high-risk patients
- Pain and pain relief
- Skin preparation
- Complex regional pain syndromes eg. Reflex Sympathetic Dystrophy and Causalgia

Physical Medicine and Rehabilitation

- Principles of physical therapy including exercise therapy and electro therapy

- Prescriptions for splints, braces, calipers, special shoes.
- Occupational therapy principle
- Principles of electro diagnosis

Prosthetic & Orthotics

- Principles of design & prosthetic fittings
- Rehabilitation of amputing
- Principles of orthotic bracing for control of disease, deformity and instability
- Concept of total rehabilitation including medical, educational, vocational and social rehabilitation.
- Disability process and disability evaluation

Research & Audit:

- Design and conduct of clinical trials
- Data analysis and statistics – principles and applications
- Principles of Epidemiology
- Audit

Medical Ethics

- Duties of care
- Informed consent
- Medical negligence
- Medico legal aspects in Orthopaedics

Hand Surgery

Basic Science

Anatomy of:

- The wrist/MCP/PIP/DIP joints and CMC joint of the thumb
- The flexor and extensor mechanism of the fingers including interaction between extrinsic and intrinsic mechanism
- The posture of the thumb in pinch, power and key grip
- The nerve supply to the hand
- The closed compartments of forearm and hand

Pathology:

- An understanding of the special circumstances associated with swelling and the effects of rising pressure in a closed compartment secondary to infection and injury
- An understanding of the special circumstances in which oedema causes fibrosis and permanent stiffness.
- Tendon injury and healing
- Nerve injury and healing
- An appreciation of the imbalances and deformities associated with inflammatory arthritis
- A classification system for congenital hand disorders
- Langers lines
- Hand tumours (eg. Ganglion/enchondroma)
- Dupuytren's disease
- Post poliomyelitis paralysis
- Cerbral palsy
- Hansens disease

Clinical Assessment:

- History of examination of hand and wrist in the assesement of tendons, distal radioulnar and radiocarpal joints, TFCC injuries.
- Ability to elicit median, ulnar and radial nerve function and disorders
- Recognition of patterns of presentation of common compressive neuropathies and brachial neuralgia
- Brachial plexus injury
- Assessment of intrinsic motors in digits and recognition of common deformities and deficiencies
- Awareness of presentation of work – related hand disorders
- Ability to examine and assess common rheumatoid hand deformities, e.g.: inferior radioulnar subluxation and carpal translocation; MCP subluxation and ulnar drift; digital Boutonniere and swan neck; thumb Boutonniere deformity and CMC disease
- Ability to recognize and assess focal hand swellings

Investigations :

- Interpretation of plain and assess stress x- rays of wrist. A Knowledge of other views.
- Awareness of role of MRI/ bone scan/ arthrography/ arthroscopy
- Place and interpretation of nerve conduction studies

Treatment:

- Knowledge of a strategy of management for the osteo arthritic rheumatoid hand. Understanding of the place of soft tissue reconstruction, joint fusion, interposition and excision arthroplasty in the treatment of arthritic hand and wrist.
- Knowledge of the management of stenosing tenovaginitis
- Knowledge of the principles of treatment for common flexor and extensor tendon injuries and of the common surgical approaches to the digital flexor and extensor compartments
- Fractures of metacarpals and phalanges
- Familiarity with the surgical treatment of Dupuytren's disease
- Awareness of the principles of tendon transfer for the reconstruction of median, ulnar and radial nerve palsy and familiarity with simple transfers, e.g. indicis to EPL
- Knowledge of splinting techniques rehabilitation principles
- Ability to plan management for finger tip injuries and undertake closed management
- Knowledge of surgical approach to digits with particular regard to the restoration of function and prevention of stiffness.
- Knowledge of the levels for digital amputation
- Injuries of ulnar collateral ligament of thumb
- Dislocations of carpal and carpo metacarpal joints
- Knowledge of closed and operative options of treatment for fractures of distal radius and common carpal injuries including scaphoid non union.
- Familiarity with the surgical treatment of common compressive neuropathy
- Ability to manage common hand infections

Knee

Basic Science

Anatomy:

- Knowledge of regional anatomy of the knee, including:
- Surface anatomy
- Neural and vascular structures and their relations with particular reference to standard anterior and posterior surgical approaches
- Bones and joints
- Functional anatomy of ligaments and supporting muscles
- Innervation's of the knee including controlling musculature
- The extend and function of the synovium and bursae of the knee
- The structure function of the menisci, and articular cartilage

Biomechanics:

- The mechanics of the patello – femoral mechanism
- The medial and lateral weight – bearing joints and their inter – relationship
- The cruciate and collateral ligaments and other ligamentous and muscular supports
- Menisci and articular cartilage

Pathology:

- The mechanism of ligamentous, bony and combined trauma to the knee and healing potential
- A complete knowledge of arthritides, including degenerate wear, ageing changes and traumatic damage
- Pathology of inflammatory disease and infection affecting the knee
- The response of synovium to debris
- Benign and malignant conditions in the knee and surrounding structures including recognized classification where appropriate

Clinical Assessment:

- A sound knowledge and understanding of:
- History and examination of the knee to include relevant surrounding structures
- The standard clinical signs of the knee and relevant adjacent structures and competent skill in describing these
- A critical understanding of rating and outcome measures in common use

Investigations:

Indications for and interpretations of:

- Radiographs – standard and specialized
- Blood investigation
- Aspiration
- Special investigations including CT, MRI and radioisotope scanning
- Arthroscopy
- Biomechanical testing

Treatment:

A sound knowledge of conservative and surgical management, including the indications for referral to a specialist of:

- Paediatric disorders, including deformity, dislocations, epiphyseal disorders, osteochondritis and discoid meniscus

- Adolescent disorders including patello femoral and meniscal dysfunction, osteochondritis dissecans
- Young adult disorders including patello femoral and meniscal injuries, instability and ligament deficiency, synovial disorders, benign and malignant tumours
- Degenerative and inflammatory arthritis, including a balanced understanding of conservative and surgical options, including osteomy, arthodesis and arthroplasty
- Traumatic disorders including skin and soft tissue injuries , fractures and dislocations of patella, tibia and femoral components, ligament ruptures and internal rearrangement of the knee.

Conservative and surgical indications and operative management

- Infections, particularly infections and inflammations of the bursae, intra- articular sepsis, prevention and management of sepsis in implant surgery
- A sound working knowledge of the range of arthroplasties for primary and revision surgery for patella femoral, unicompartmental and total replacement of the knee with particular reference to secure bone anchorage, alignment, ligament stability and optimizing range of movement; a good knowledge of post-operative complications, their prophylaxis and management
- A knowledge of the indications and techniques of revision surgery particularly for aseptic and septic loosening
- A knowledge of simple arthroscopic surgery including meniscectomy, trimming and shaving
- An appreciation of complex arthroscopic procedures
- An appreciation of medical and surgical techniques available to repair and replace articular cartilage

Ankle & Foot Surgery

Basic Science

Anatomy:

- Bones and articulations
- Ligamentous structures – ankle/hindfoot/midfoot
- Plantar fascia and MPT anatomy
- Surface markings of neural and vascular structures
- Tendon anatomy
- Muscle compartments of the foot

Biomechanics

- Function of the lower limb and foot in gait
- Ankle and subtalar joint
- Plantar fascia mechanisms
- Tendon function
- Orthoses and footwear

Pathology:

Arthritides

- Degenerative joint disease
- Rheumatoid foot disease

Neuropathy

- Neuropathic joint and skin changes

Tumours

- E.g. osteoid osteoma and plantar fibroma

Clinical Assessment:

History and clinical examination of the foot and ankle in order to assess pain, joint function, deformity, nerve, muscle and tendon function Ability to recognize and assess the following diseases of the ankle and foot:

Neurological disorders:

- Charcot joint
- Morton's neuroma opportunities
- Nerve entrapment
- Neurological foot deformity

Trauma:

- Evaluation of skin and soft tissue injury
- Compartment syndrome
- Recognition of all fractures

Ankle and hindfoot disorder:

- Hindfoot pain
- Ankle instability
- Heel pain
- Degenerative disease of the ankle
- Rheumatoid arthritis
- Osteochondritis dissecans of talus

Forefoot disorders:

- Hallux valgus
- Hallux rigidus
- Lesser toe deformities
- Metatarsalgia
- Inflammatory arthritis

Tumours:

- Ability to recognize and assess local foot swellings

Diabetic foot**Complex deformity**

- Flatfoot deformity – mobile and rigid
- Cavus deformity
- Residual congenital foot deformity

Investigations**Radiography**

- Standard foot and ankle views

CT, MRI and Scintigraphy:

- Knowledge of role of these ancillary investigations in certain specific conditions e.g. infection, tumour, tibialis posterior rupture, osteonecrosis

EMG

- Relevance to foot and ankle disorders

Treatment:**Non – operative:**

- Knowledge of rational basis for the use of footwear modifications, and total contact casting

Operative:

- Detailed knowledge of closed and operative methods for management of fractures and dislocations of ankle, hindfoot and forefoot, including knowledge of common reconstructive surgical procedures for foot deformity including hallux valgus, lesser toe deformity, acquired flat – foot, to include arthrodesis, osteotomy and soft – tissue reconstruction.
- Knowledge of common amputations through foot and ankle
- Knowledge of common reconstructive surgical procedures for degenerative, inflammatory and paralytic disorders of ankle and foot including arthrodesis, arthroplasty, excision arthroplasty procedures to first ray both proximal and distally for management of hallux valgus and rigidus. Knowledge of treatment of congenital and neglected deformities

Hip**Basic Science****Anatomy:**

- Basic knowledge of the regional Anatomy of the Hip including:

- Development of the Hip joint
- Relationship of bony elements
- Blood supply of the femoral head
- Anatomical course all major regional vessels and nerves
- The capsule, labrum and related ligaments
- An understanding of the action, anatomy and innervation of the regional musculature
- Detailed knowledge of the applied anatomy of common surgical approaches to the Hip (medial, anterior, lateral and posterior)

Biomechanics:

- An understanding of the lever arms, muscles and body weight force that produce the joint reaction force both normal and abnormal hips
- An understanding of the application of these principles to the rationale of both pelvic and femoral osteotomies, and replacement arthroplasty.
- Knowledge of the tribological properties of materials used for articulating surfaces
- Knowledge of biocompatibility and mechanical properties of materials in common use in total hip arthroplasty

Pathology:

- Basic knowledge of the Pathology of pyogenic and non- pyogenic arthritis, slipped upper femoral epiphysis (SUFE), Perthes' disease and hip dysplasia
- Mechanism and pattern of common fractures and fracture dislocations around the hip (intracapsular, extracapsular, acetabular and periacetabular, femoral head, etc.)
- Knowledge of the Pathology of osteoarthritis, rheumatoid arthritis and the seronegative arthritides at the hip and of osteonecrosis of the femoral head.
- Familiarity with current theories of the aetiopathogenesis of osteoarthritis
- An understanding of the Microbiological rationale for the prevention of sepsis in total hip arthroplasty.

Clinical assessment

- A sound knowledge of clinical assessment of the hip, lumbosacral spine and knee. Particular reference should be paid to the gait, the Trendelenburg sign, limb length, loss of movement and deformity at the joint
- The trainee needs to be well informed of current opinion regarding aetiopathogenesis, clinical presentation and appropriate investigation of the hip

- Proximal femoral fractures (intracapsular, extracapsular) and simple fracture dislocations of the hip
- Osteoarthritis and the inflammatory arthropathies
- Perthes' disease
- Slipped upper femoral epiphysis
- Septic arthritis
- Osteonecrosis
- Soft tissue conditions around the hip (snapping hip, gluteus medius tendonitis, etc) . A working knowledge of the clinical presentations and investigations of :
 - The sequelae of SUFE
 - Juvenile arthritis
 - Non pyogenic arthritis
 - The painful total hip replacement
 - TB Hip

Investigation :

- A working knowledge of the interpretation of plain radiographs, dynamic arthrography, CT, bone scintigraphy and MRI of the hip rejoin
- A working classification the proximal femoral and periacetabular fractures. Also , mechanisms and classification of failure of joint replacement and of periprosthetic fractures

Treatment

- Non – Operative
- An understanding of the principles of traction, bracing and spica immobilization. An understanding of the non operative aspects of the management of hip pathology

Operative

- A thorough knowledge of soft tissue history, osteotomy, arthrodesis, and arthroplasty (excision and replacement).
- A sound knowledge of : internal fixation of proximal femoral fractures, hemiarthroplasty for intracapsular fractures, primary total hip replacement for OA and inflammatory arthropathies in the elderly, simple proximal femoral osteotomies. Familiarity with potential complications(i.e. thromboembolism, sepsis, dislocation, etc) and be aware of current opinion on the prevention and management of these complications

- A knowledge of the indications for , and principles of complex proximal femoral osteotomies, hip arthroscopy, reconstruction of the hip in young adults (JCA and hip dysplasia, etc), complex hip revision surgery
- An appreciation of complex acetabular and pelvic fractures, complex periacetabular osteotomies
- An understanding of the place of modern technologies such as, joint resurfacing procedures minimally invasive hip replacements and computer assisted implantation in the management of hip pathology and the attendant risks and complications

The spine

Basic science

Anatomy:

- Development of the spine, spinal cord and nerve roots
- Surgical anatomy of the cervical, dorsal and lumbosacral spine
- Anterior and posterior surgical approaches to the spine at each level

Biomechanics

- Basic knowledge of the biomechanics of the cervical and lumbosacral spine
- An understanding of the biomechanics of spinal instability as applied to trauma, tumour, infection and spondylolysis / listhesis
- Biomechanics of spinal deformity
- A knowledge of the basic mechanics of spinal instrumentation

Pathology

- Pathophysiology of the ageing spine and degenerative disc disease
- Acute and chronic infections of the spine including Tuberculosis
- Pathology of spinal deformity
- Pathology of the acutely prolapsed cervical and lumbar disc
- Recognition of pattern of Spinal injury and associated cord and nerve root damage
- Tumours of the spine
- Diffuse idiopathic skeletal hyperostosis (DISH)

Clinical Assessment:

- A thorough knowledge of general and orthopaedic history taking and examination
- A Knowledge of the assessment of spinal deformity
- An understanding of the assessment of thoracic pain
- A sound knowledge of clinical assessment of the spine for low back pain, sciatica, spinal claudication, neck pain, radiating arm pain, spinal injury and incipient myelopathy
- A knowledge of the assessment of spinal tumour
- A basic knowledge of the assessment of a patient after failed spinal surgery

Investigation:

- A thorough knowledge of the basic investigations required in spinal surgery, specifically: blood tests, plain radiographs, bone scintigraphy, discography, electrophysiological studies (including cord monitoring) CT scanning, MRI scanning
- A thorough knowledge of how each of these investigations contributes to the diagnosis and management of each of the major areas of spinal disease

Treatment:

Non- operative

- A knowledge of the non – surgical methods available for the treatment of low back pain, sciatica, claudication, neck pain, spinal deformity, instability, tumour, infection and fracture to include:
- Analgesics and NSAIDs, physiotherapeutic regimes, pain clinic techniques, bracing, use of radiotherapy and chemotherapy, non – operative management of spinal injuries

Operative

- A sound knowledge of the indications for and operative surgical management of the acute prolapsed lumbar intervertebral disc, spinal stenosis, lumbar spinal instability due to spondylolysis / listheses
- A knowledge of the indications for, and operative surgical management of the acutely prolapsed cervical disc, cervical stenosis, spinal injury and the surgery of spinal infection
- Vertebroplasty, Kyphoplasty in osteoporotic vertebral compression
- A basic knowledge of the surgery of spinal deformity and tumours of the spine

Trauma

Basic Science

Anatomy:

- Applied to diagnosis and surgical treatment of common bone, joint and soft tissue injuries

- Knowledge of those anatomical structures particularly at risk from common injuries or in surgical approaches
- Physical anatomy and its application to injury

Biomechanics:

- Application to open reduction and internal fixation of fractures and external skeletal fixation
- Applied to fracture formation and fracture treatment both operative and non operative
- Biomechanics of implants and fracture fixation systems, including their material properties

Epidemiology and research Methods:

- Research and audit methods including the design of clinical trials

Pathology:

- Applied to fracture and soft tissue healing, including skin, muscle, tendon and neurological structures
- Classification systems for fractures and dislocations
- Pathology of non – union of fractures
- Response of the body, and local musculoskeletal tissues to infection
- Systemic response of body to major injury
- Mechanisms underlying Acute Respiratory Distress Syndrome and similar life threatening conditions
- Science of fluid replacement therapy in the acutely injured including application to the treatment of burns.
- Science of treatment of compartment syndrome
- Response of infants, children and the elderly to injury

Clinical Assessment:

- Initial clinical assessment of the patient with severe injury, including spinal cord injury, soft tissue injury, burns and head injury
- Assessment of all types of fracture and dislocation, their complications, early and late
- Identification of life threatening / limb threatening injuries. Understanding priorities of treatment. Principles of damage control orthopedics

Investigations:

- Knowledge of the principles, application and side effects of commonly used investigations, including radiographs, CT and MRI scans, radioisotope imaging ultrasound scans and electrophysiological investigations.

Treatment:

- A sound knowledge of normal variants, e.g. knock knees, bow legs and flat feet A detailed knowledge of the treatment for
- Fractures (including non – accidental injury) and growth plate injuries and recognizes the sequelae
- Bone and joint infection
- Common childhood orthopaedic conditions, e.g. irritable hip, anterior knee pain

A working knowledge of the treatment for

- Slipped epiphysis
- Perthes' disease
- Developmental dysplasia of the hip
- Talipes
- Scoliosis
- Simple foot deformities (e.g. hallux valgus, metatarsus varus)
- Simple congenital hand abnormalities (e.g. trigger thumb)
- Osteogenesis imperfecta
- Skeletal dysplasias
- Tarsal coalitions
- Torticollis
- Leg length discrepancy : Ilizarov methodology

Birth palsy

A knowledge of

- Screening services for congenital abnormalities
- Assessment of physical disability

Shoulder & Elbow**Basic Science****Anatomy:**

Basic knowledge of the regional anatomy of the shoulder including

- Detailed anatomy of the sternoclavicular acromioclavicular, glenohumeral and elbow joints to include the connecting bones, muscles and tendons acting across them, neurovascular supply, bursae and relationships to local structures
- Surgical approaches: deltopectoral and posterior approaches to glenohumeral joint; superior (McKenzie) approach to rotator cuff and surgical approaches to the acromioclavicular and sternoclavicular joints
- Structure and function of the above joints; a clear understanding of the static and dynamic stabilizers of the glenohumeral and elbow joints

Biomechanics:

- Biomechanics of the Shoulder and elbow

- Knowledge of the various types of shoulder and elbow prostheses including the factors influencing design, wear and loosening.

Pathology:

Sound knowledge of all commonly encountered benign and malignant conditions affecting the shoulder girdle, elbow and surrounding soft tissues

- A basic understanding of the Pathology of:
- Impingement and rotator cuff disorders
- Instability of the shoulder and the elbow
- Inflammatory and degenerative conditions affecting the articular cartilage and synovium infection
- Adhesive capsulitis of the shoulder
- The pathology of the stiff elbow
- Disorders such as ulnar neuritis and tennis or golfer's elbow

Clinical Assessment:

- Detailed history and examination of the painful, stiff or unstable shoulder or elbow
- Knowledge of clinical tests used specifically to assess instability of the shoulder and elbow, rotator cuff disorders, the stiff shoulder or elbow and the use of local anesthetic in assessment. Examples are the apprehension tests for shoulder instability, impingement signs and tests, gerber's lift off test, Napoleon's sign, elbow instability tests ulnar nerve assessment
- Knowledge of conditions causing referred symptoms to the shoulder and elbow (e.g. cervical spine diseases, entrapment neuropathies and thoracic outlet disorders)
- Knowledge of including instability, impingement, rotator cuff tears, adhesive capsulitis, osteoarthritis, rheumatoid disease, avascular necrosis, biceps tendon disorders of the acromioclavicular and sternoclavicular joints and scapula
- Knowledge of common conditions affecting the elbow including instability, osteoarthritis, rheumatoid arthritis, causes of stiffness, soft tissue problems such as medial and lateral epicondylitis, neuropathies and fractures around the elbow

Investigation:

- Knowledge of plain radiographs as used to assess shoulder and elbow disorders. This should include a knowledge of those special
- Knowledge of the value of ultrasound, arthrography, CT and MRI as used to assess the shoulder and elbow.
- Knowledge of the use and abuse of arthroscopy of the shoulder and elbow including a knowledge of normal and abnormal arthroscopic finding

Treatment:

Non – operative

- An ability to supervise the non – operative management of fractures, dislocations and soft tissue injuries around the shoulder and elbow
- An in – depth knowledge of the management of straightforward fractures and dislocations of the shoulder girdle and elbow. Knowledge of the treatment options for more complex fractures
- An ability to recognize upper limb injuries involving injuries to the brachial plexus and refer on as appropriate
- A knowledge of injection techniques for both the shoulder and the elbow
- Knowledge of both the non operative and operative treatment of common disorders such as recurrent anterior traumatic instability of the shoulder, rotator cuff impingement and small rotator cuff tears, adhesive capsulitis, acromioclavicular joint pain.

Operative:

- A knowledge of the management of the soft tissue elbow disorders such as lateral and medial epicondylitis and ulnar neuropathy
- Knowledge of the indications, options and complications for prosthetic replacement of the shoulder and elbow
- Knowledge of the indications and benefits of arthroscopy of the shoulder and elbow .
- Understanding the principles of management of tumours around the shoulder and elbow.

SKILLS TO BE ACQUIRED DURING THE TRAINING PERIOD

Sl. No.	Name of the procedure	Observed	Assisted	Performed Under Supervision
	ORTHOPAEDICS			
1	Skin Traction Application of splints Application of plaster, slab & cast			Yes
2	Skeletal traction of upper tibia, distal tibia, lower Femoral, Trochanteric screw, Olecranon,			Yes

	Calcaneal and skull traction			
3	Wound dressing and management Prescription of Orthotics			Yes
4	Management of open fractures - Debridement, external fixation - Soft tissue reconstruction - including bone coverage			Yes
5	Open reduction and internal fixation of Fractures - Plate Osteosynthesis in shaft Humerus and both bones forearm fractures - Tension band wiring of Olecranon, Patella & Medial malleolus fractures - Krischner wire fixation of supra condylar fracture of humerus - Cannulated screw fixation for fracture neck of femur - Dynamic Hip Screw of Trochanteric fracture - Intramedullary nailing for femoral shaft fracture - Fixation of Potts fracture - Excision of Head Radius			Yes Yes Yes Yes Yes Yes Yes Yes
6	Fixation of fractures like proximal Humeral, Supracondylar Femur, Proximal tibia & Talus fracture- Dislocation Interlocking Nail – Femur, Tibia		Yes	
7	Spine - Exposure to spine by posterior, anterior and anterolateral approaches		Yes	Yes
8	CTEV Manipulation and POP application Tendo Achilles lengthening			Yes Yes
9	Postero – medial soft tissue release Bony procedures including triple arthrodesis		Yes Yes	
10	High tibial osteotomy		Yes	
11	Tendon repair		Yes	
12	Poliomyelitis			
	Hamstring release & Posterior Capsulotomy Flexor Abductor release			Yes
	Corrective osteotomies of Humerus, Femur and Tibia		Yes	
	Knee & Ankle arthrodesis Pantalar and triple arthrodesis		Yes	
	Limbs lengthening / illizarov procedure		Yes	
13	Bone & Joint infections Apiration of joint			Yes
	Drilling / Decompression of metaphysis Drainage of abscess			Yes

	Sequestrectomy & saucerisation Girdlestone/ Excision Arthroplasty of Hip			Yes
14	Arthrolysis of elbow joint		Yes	
15	Bone tumors			
	- Biopsy from tumor - Excision of osteochondroma - Curettage & Bone grafting			Yes Yes Yes
16	Amputations			Yes
17	Limbs salvage procedures		Yes	
18	DESIRABLE PROCEDURES Arthroscopy of knee Joint replacement - Hip Joint - Knee joint Peripheral nerve repair Tendon transfer procedures Spinal stabilization Procedures like pedicular screw Scoliosis Corrections	Yes Yes Yes	Yes Yes Yes Yes Yes Yes Yes	

Investigations / tests which the candidates must know to interpret

	Name of investigations . tests
Hematological investigation in orthopaedics conditions like	- C- reactive protein, - Rheumatoid factor, - HLA – B27 - Serum Electrophoresis - Serum Ca, P, Alkaline phosphatase, Uric Acid - Total Proteins & A.G. ratio - Elisa
Urine	- Bence Jones proteins - 24hr Urinary Ca
Radiological investigations	- Plain radiography - CT Scan, MRI - Radio – isotope bone scan
Histopathological slides of common orthopaedic conditions like	- Interpretation of Tubercle, - Myeloma - Osteosarcoma - Ewing Sarcoma

SAMPLE CASES FOR PRESENTATION AND DISCUSSION

Long cases

- ☐ Fixed / Ankylosed hip
- ☐ Neglected fracture neck of femur
- ☐ Tubercular hip
- ☐ Neglected traumatic dislocation hip
- ☐ Potts paraplegia
- ☐ Extra dural cord compression
- ☐ Prolapsed intervertebral disc
- ☐ Spinal Canal stenosis
- ☐ Cauda equina syndrome
- ☐ Avascular Necrosis of Hip
- ☐ Traumatic paraplegia

Short cases

- ☐ Cubitus / Valgus
- ☐ Non union Humerus with or without radial nerve palsy
- ☐ Non union lateral condyle of Humerus
- ☐ Infected non union
- ☐ Chronic osteomyelitis
- ☐ Post polio flail shoulder / paralysed elbow
- ☐ Neglected unreduced Dislocation Elbow
- ☐ Neglected unreduced Dislocation Shoulder
- ☐ Malunion Colles fracture
- ☐ Carpal tunnel syndrome.
- ☐ Bone tumors like Osteosarcoma, Ewing's Sarcoma, Giant cell tumor, Osteochondroma, Osteoid osteoma etc
- ☐ Genu varum / Genu Valgum
- ☐ Ruptured Tendo Achillis
- ☐ Erb's palsy / Brachial plexus injury
- ☐ Nerve injuries – Median Nerve, Radial Nerve, Ulnar Nerve, Sciatic Nerve, common Peroneal Nerve

Spots

- ☐ Pathological Specimen – giant cell Tumor, Osteosarcoma, Ewings sarcoma, Sequestrum, Madura foot
- ☐ Bones
- ☐ Instruments
- ☐ X – Rays
- ☐ Orthotics/ Prosthetics – Patellar tendon bearing prosthesis, Cock up Splint, Denis brown splint, Ischial weight relieving caliper, Jaipur foot.

Guidelines for Thesis / Dissertation

Thesis / Dissertation is a must for every candidate.

Collection of data, investigations and type of treatment done should be specifically written. Research methodology is to be followed through out the study. The guide should be a senior professor with minimum 10 years postgraduate experience. Subject selected should be feasible within the time allotted for the work. The work should be original.

The institution should give technical assistants and lab facilities. The candidate for the research work should try no experimental work.

Statistical analysis and data should be entered. The protocol for the thesis should be given to the university within 3 months of joining the institution. One professor can guide one candidate during the academic year.

University may reject thesis if it is not up to the mark or a fake one or the some unethical practice during the study period.

Thesis should be submitted 6 months prior to the examination. Four copies should be submitted to the university duly recommended by the guide, H.O.D and Medical Director of the institution. One copy should be submitted to the department for future reference and academic purposes. Protocol should be as follows:

Title –Brief clear
Introductions
Objectives of study
Materials & Methods
Results and Analysis
Discussion
Conclusion
Bibliography

Annexure – data collection, charts, questionnaire, follow up, observations must be in a checklist.

Posting to the other departments:

One month posting to the artificial limb center & physiotherapy.

One month posting to Plastic Surgery department.

The candidate must attend at least 2 national CME during the course.

Attend at least two instructional course lectures.

Periodic test – 3 tests in 3 years – at the end of each year, the test will be conducted at the end of each year and last final test will be done 3 months before the final examination, written, clinical and viva voce.

Log book should be maintained by the candidates.

There will be internal assessment by reviewing this and evaluated by the external examiner.

ACADEMIC ACTIVITIES

1. Clinical discussion in the outpatient department and also bed side clinical examination in the wards. Diagnosis, lab investigations and treatment modalities, record maintenance, discussion on various modalities of treatment etc.
2. Journal club, ICL, paper presentation and discussion.
3. Seminar – one seminar one hour every week.
4. X- ray review – every day x – ray review of the new and old cases admitted or seen in the last OPD or in the casualty and discussion regarding diagnosis and treatment.
5. Case presentation. One long case and 3 short cases in the conference room once in a month – discussion, diagnosis and management.
6. Dissertation work – preparation & presentation of the work and its review of literature in the 1st year and the whole work by the 2nd year.
7. He should attend community medical camps at least 1 per year.
8. Presentation of the cases in the Grand rounds / combined rounds once in 6 months
9. Emergency work in the casualty – 1 junior PG and 1 senior PG will attend the casualty duty on rotation.
10. He should attend the operation theatre, make preparation for the smooth conduct of the operation, and arrange the instruments, table, C-Arm etc. for the surgery.

Courses

Paper - I Basic Science Related to Orthopaedics (Course U19MSOR01)

- CO1: Understand the Anatomy, Physiology and biomechanics of musculoskeletal system.
- CO2: Know the relevance of investigations- indications, interpretation and basic knowledge of performing the same
- CO3: Understand the principles and basics of Physical medicine and rehabilitation with accurate knowledge of traction, orthotics and prostheses
- CO4: Know the basics of research and take part in a audit. Plan and execute a study with guidance from a faculty to publish in a reputed journal.
- CO5: Learn the relevance of medical ethics with importance to duties of care, informed consent and medicolegal aspects of orthopedics

Anatomy :

- **Clinical and functional anatomy with pathological and operative relevance**
- Anatomy and embryology of nervous and vascular systems
- Surgical approaches to the limbs and axial skeleton
- Anatomy and embryology of musculoskeletal system
- Histology

Tissues :

- Bone – Structure
- Cartilage – articular, meniscal
- Structure & Function
- Muscle and tendon – Structure & Function
- Synovium – Structure & Function, synovial fluid analysis
- Ligament – Structure & Function, synovial fluid analysis
- Nerve - Structure & Function 3
- Intervertebral disc - Structure & Function

Physiology, Biochemistry & Genetics:

- Structure and function of connective tissues
- Application /relevance of modern genetics to orthopaedic disease and treatment
- Bone healing and repair
- Shock – types, physiology, recognition and treatment
- Metabolism and hormonal regulation of musculoskeletal system and other related orthopaedic physiology.
- Metabolic and immunological response to trauma, poly trauma and management.
- Blood loss in trauma/ surgery, fluid balance and blood transfusion
- Bone grafts, bone banking and tissue transplantation.

Pathology – General Pathology

- Tumour pathology in Musculoskeletal diseases.
- Other orthopaedic pathology including osteogenesis imperfecta, spondylosis, spondylolisthesis, synostoses, etc
- Gene therapy in Orthopaedic disorders, stem cells in Orthopaedic surgery

Biochemistry

- General biochemistry
- Biochemistry of bones
- Biochemical aspects related to orthopedic diseases

Paper - II Traumatology and Rehabilitation (Course U19MSOR02)

CO1: Understand the process of fracture healing and healing of soft tissues in traumatic injuries

CO2: Training to part of the trauma team with indepth knowledge of musculoskeletal trauma and basic knowledge about trauma involving other areas and life support in ICU

CO3: Know about non operative and non operative management of closed fractures and acquire the skill in managing them

CO4: Understand the principles of Open fracture management and acquiring the skills in management including a basic knowledge of reconstruction options and flap covers

CO5: Learn the basics of imaging in trauma including USG, CT and MRI and about rehabilitation of trauma victims

Knowledge in management of trauma(non operative and operative , understanding fracture /soft tissue healing , Principles of open fracture management

Physical Medicine and Rehabilitation

- **Principles of physical therapy including exercise therapy and electro therapy**
- Prescriptions for splints, braces, calipers, special shoes.
- Occupational therapy principle
- Principles of electro diagnosis

**Paper - III Orthopaedic Diseases and Paediatric Orthopaedics
(Course: U19MSOR03)**

CO1: Understand the congenital conditions and acquire proficiency in examining a child and managing pediatric orthopedic conditions

CO2: Train to be familiar and manage infections in musculoskeletal system with special importance to tuberculosis

CO3: To identify and treat Tumours of musculoskeletal system with in depth knowledge of investigations and techniques of obtaining biopsy. To know the basics of limb salvage and amputations

CO4: Understand the pathology and treatment options in various arthritis- with extensive knowledge of Osteoarthritis, Rheumatoid arthritis and sero negative arthritis

CO5: Know the basics of orthopedic rehabilitation with importance to working with Physical and occupational therapist , Knowledge about traction and splints, assisted ambulation and gait

- **Knowledge of the presentation, radiological features, pathological features, treatment and outcome for common benign and malignant tumours**
- Understanding of the principles of management of patients with metastatic bone disease in terms of investigation, prophylactic and definitive fixation of pathological fractures and oncological management.
- **Knowledge of the presenting features, management and outcome of soft tissue swellings, including sarcomas**

General:

- Osteoarthritis
- Osteoporosis
- Osteopetrosis
- Metabolic bone disease
- **Rheumatoid arthritis and other arthropathies (inflammatory, crystal, etc.)**
- Hemophilia
- Inherited musculoskeletal disorders – Mucopolysaccharidosis and dysplasia of bone: epiphysis metaphysis, diaphysis, marrow and whole bones.
- Neuromuscular disorders – inherited and acquired
- Fluorosis
- Long term steroid usage and Avascular necrosis of head of femur
- Osteonecrosis
- Osteochondritis
- Heterotopic ossification
- Metastases
- Management of open fractures
- **Disaster management**
- Management of war wounds & civil disturbance.

Paper - IV Recent Advances (Course: U19MSOR04)

CO1: Acquire ability to search and go through the recent literature and to accurately assess the level of evidence. Ability to innovate and to apply the knowledge to the Indian conditions. Use of electronic devices in archiving patient data and measurement of parameters.

CO2: Up to date knowledge of newer implants and techniques in trauma care including the current ATLS protocol

CO3: Knowledge of Joint reconstruction procedures and arthroscopic surgery

CO4: Knowledge of spinal procedures, Orthopedic Oncology, Hand injuries and foot and ankle including Diabetic foot management

CO5: Attain knowledge of Bone substitutes, Newer options in bridging bone defects, Current trend in treating Osteoporosis and advanced imaging modalities like PET

Competency in identifying latest important articles and its application in day to day practice . Knowledge of latest ATLS protocols . Knowledge of bone substitutes and its application

Soft Skills (Course: U19MSOR05) Elective Course

CO1: Teaching abilities.

CO2: Ability to conduct a clinical research

CO3: Knowledge of medical ethics and etiquette and proper communication skills.

CO4: Ability to work as the member of a team.

CO5: The attitude to update knowledge and skills.

SCHEME OF EXAMINATION

Theory examination : 4 papers

Practical Examination:

Clinical: One long case (30 mins)

Three short cases (10 mins x 3)

Oral,

Instruments X – rays, Specimen, slides, Orthotics & Prosthetics

Theory papers

1. There shall be 4 papers – 3 hour test for each paper.
2. One essay type and eight short note questions in each paper.
3. Maximum marks for each theory paper is 100
4. Practical 70 marks Long case
30 marks short case (10 x3)
Viva voce : 100 marks (25 x 4)

Total = 400 theory + (theory and practical) to declare successful

Paper1:

Basic science related to orthopaedics

Paper 2:

Traumatology and rehabilitation

Paper 3.

Orthopaedic diseases and Paediatric orthopaedics

Paper 4: Recent advances

MS Orthopaedics

Paper – 1

Basic science related to Orthopaedics

Time – 3 Hours

Max. Marks – 100

Answer all questions.

1. Describe the blood supply to the Head of femur. Write merits and demerits of different modalities of treatment of fracture neck of Femur in various age groups.

2. Write Short notes on
 - a. Automatic bladder
 - b. Synovial fluid analysis
 - c. Dorsal digital expansion
 - d. Ulnar paradox
 - e. Bone morphogenic protein
 - f. Glasco coma scale
 - g. Calcium homeostasis
 - h. NSAIDs in Orthopaedics

10 x 8 = 80 Marks

MS Orthopaedics

Paper – 2

Traumatology and rehabilitation

Time – 3 Hours

Max. Marks - 100

Answer all questions.

1. Classify ankle fractures. Briefly outline the mechanism of injury and management.

20 marks

2. Write Short notes on

- a. Monteggia #
- b. Floor reaction orthosis
- c. Closed rupture of tendoachillis
- d. TENS
- e. Anterior dislocation of Hip
- f. Pylon Prosthesis
- g. Atlas fracture
- h. Crutch walking

10 x 8 = 80 Marks

MS Orthopaedics

Paper – 3

Orthopaedic diseases and Paediatric orthopaedics

Time – 3 Hours

Max. Marks – 100

Answer all questions.

1. Describe the aetiopathology, clinical features and management of Perthe's disease.

2. Write Short notes on
 - a. Blounts Disease
 - b. Giant cell tumour
 - c. Middle path regime
 - d. Rheumatoid hand
 - e. Coccygodynia
 - f. Pigmented Villonodular synovitis
 - g. Osteomalacia
 - h. Volkman's ischaemic contracture

10 x 8 = 80 Marks

MS Orthopaedics

Paper – 4

Recent advances

Time – 3 Hours

Max. Marks – 100

Answer all questions.

1. Describe the aetiopathology, clinical features and management of Osteoporosis in an adult female.

20 Marks

2. Write Short notes on

- a. Locking compression plate
- b. Bio absorbable implants
- c. Artificial bone substitutes
- d. Carbon fiber implants
- e. Arthroscopic rotator cuff repair
- f. Leflunamide
- g. Isotope scanning
- h. Recent trends in articular cartilage repair

10 x 8 = 80 Marks

MAINTENANCE OF LOG BOOK AND RECORDS

Each candidate must maintain a logbook in which participation of various teaching learning activities by the candidate must be entered properly. Number of presentation and operation assisted, operations done with the senior faculties and operation done by self should be entered. Logbook should be corrected and signed by the Unit Chief by every month.

Computer Assistance training

Storage of data from various important medical journal, from websites should be retrieved and to increase the knowledge. EMR learning is a must in this hospital.

Periodic examination

At least 3 test should be given to the candidates by the end of 1st and 2nd year and the last one 3 months prior to the final examination,

Check list for the evaluation of journals, seminar, clinical work, war work, casualty work, OPD work, theatre work, clinical presentation, teaching skills and dissertation presentation should be maintained I proper Performa and should be graded

Evaluation of the work

Sl. No.	Points to be considered	Poor 0	Below Average 1	Average 2	Above Average 3	Good 4	Very Good 5

Medical ethics

In modern times patient has the right to know about his disease in detail and has the right to know about the treatment protocol, investigations going to be done and different methods of treatment option. Doctor – patient relation should be very firm and cordial and then only he will have the confidence in the treating doctor. To accomplish this goals and objectives, which are laid, down are very important. So medical ethics which is a study of the moral value as applied medicine, encompasses practical application in clinical setting as well as work on its history, philosophy, theology and sociology. The human values are very important and the doctor should act in the best interest of the patient. Informed consent has been taken as and when required when the patient is faced with a many co-morbid diseases. All the documents should be kept in confidentially by the doctor. Patient has the right to refuse or choose the treatment. There should be fairness in the treatment and equally in all the matters of consideration. There should good rapport with the patient, his family members so that he can understand the real fact about his disease. So communications with the patient or his relatives are very important. The medical ethics have been included in a separate order by the medical council of India Ref. No: MCI – 21 (2)2001 section 20A 33 (M) of IMC.

Code of medical ethics

Duties of physician to their patients

Duties of physician in consultation

Responsibilities of physician to each other

Duties of physician to the public and to the paramedical professionals.

Unethical acts

Misconduct.

Punishment and disciplinary action.

Declaration

1. I pledge myself my life to the service of humanity.
2. Even under threat, I will not use any medical knowledge contrary to the laws of humanity.
3. I will maintain the utmost respect for human life from the time of conception.
4. I will not permit considerations of religion, Nationality, race, party politics or social standing to intervene between my duty and my patient.
5. I will practice my profession with conscience and dignity.
6. The health of my patient will be my first consideration.
7. I will respect the secrets that are confined in me.
8. I will give my teachers, the respect and gratitude, which is due to them.
9. I will maintain by all means in my power, the honor and noble traditions of medical profession.
10. I will treat my colleagues with all respects and dignity.
11. I shall abide by the code of medical ethics as enunciated by Indian medical council (Professional conduct, etiquette and ethics).
12. I make these promises solemnly, freely and upon my honor.

Reference Books

1. Campbell's Operative Orthopaedics 11th Edition
2. Fractures in Adults and Children – Charles A Rockwood Junior, David P Green 6th Edition Lippincott Williams & Wilkins
3. Orthopaedic principles and their application – Samuel Turek
4. Merce's Orthopaedic surgery 9th edition – Robert B Duthie & George Bentley (Arnold)
5. J.N. Wilson – Watson Jones fractures and joint injuries – 6th edition – B.B. Churchill Livingstone Ltd., New Delhi.
6. Surgery of the knee – 2 Vol. Insall & Scott – 4th edition – Churchill & Livingstone
7. Pediatric Orthopaedics Lowell & Wintres – Raymond T Morrissy & Stuart L Weintin – 6th edition
8. Browner – Skeletal trauma 3rd edition Browner, Jupiter Levine
9. Tachdjain's Paediatric Orthopaedics – 4th edition – edited John Anthony Herring & pub. By Saunders – Elsevier
10. Text book of Orthopaedics - & Trauma edited by Dr. Kulkarni – 2nd edition Jaypee Brothers, New Delhi
11. Enneking bone tumors
12. Campanacci bone tumours.
13. System of Orthopaedics – Graham Apley
14. Text book of spinal surgery 2nd edition Keith H Bridwell – Lippincott Raven

15. greens operative hand surgery – 5th edition Elsevier
16. Diagnosis of bone and joint disorders – Donald Resnick



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as deemed to be university under section 3 of UGC Act 1956, vide notification No.F.9-52000-U.3)

BACHELOR OF DENTAL SURGERY

REGULATIONS AND SYLLABUS 2017

BRANCH – VI

ORAL PATHOLOGY & ORAL MICROBIOLOGY

Objectives:

- ❖ To train a post graduate dental surgeon so as to ensure higher competences in both general and special pathology dealing with the nature of oral diseases, their causes, processes and effects.
- ❖ An oral pathologist is expected to perform routine histopathological evaluation of specimens relating to oral and perioral tissues, to carry out routine diagnostic procedures including hematological, cytological, Microbiological, Immunological and ultra structural investigations.
- ❖ He/she is expected to have an understanding of current research methodology, collection and interpretation of data, ability to carry out research projects on clinical and or epidemiological aspects, a working knowledge on current databases, automated data retrieval systems, referencing and skill in writing scientific papers.
- ❖ He/She is expected to present scientific data pertaining to the field, in conferences both as poster and verbal presentations and to take part in group discussions.

BROAD OUTLINE OF THEORETICAL, CLINICAL AND PRACTICAL COURSES:

1. Study of principles of routine and special techniques used for histopathology including principles of histochemistry, Immunochemistry, applied and theoretical biochemical basis of histochemistry as related to oral pathology.
2. Advanced histological and histopathological study of dental and oral tissues including embryonic considerations, Clinical considerations, biology, histology, Pathology, prognosis and management of oral oncology, Concepts of oral premalignancy.
3. Study of special and applied pathology of oral tissues as well as relation of local pathologic and clinical findings to systemic conditions.
4. Oral microbiology and their relationship to various branches of dentistry.
5. Oral microbiology affecting hard and soft tissues. Study of clinical changes and their significance to dental and oral diseases as related to oral pathology
6. Forensic odontology.
7. Inter institutional postings such as cancer hospital, dermatology clinics, regional HIV detection centers, sophisticated instrumentation centers for electron microscopy and other techniques.
8. Maintenance of records of all post graduates activities.
9. Library assignment.
10. University Dissertation.

A. COURSE CONTENTS:

First year

1) BIOSTATISTICS AND RESEARCH METHODOLOGY:

- ❖ Basic principles of biostatistics and study as applied as applied to dentistry and research.
- ❖ Collection / organization of data / measurement scales presentation of data and analysis.
- ❖ Measures of central tendency.
- ❖ Measures of variability.
- ❖ Sampling and planning of health survey, BIAS.
- ❖ Probability, normal distribution and indicative statistics.
- ❖ Estimating population values.
- ❖ Tests of significances (parametric / non – parametric qualitative methods).
- ❖ Analysis of variance
- ❖ Association, correlation and regression.

Approach:

- ❖ Didactic lectures on biostatics and discussion on research methodology by eminent researchers.
- ❖ Two – day P.G. orientation course including general approach PG course, library and main dissertation, journal club topic selection and presentation, seminars, clinico – pathological meets, teaching methodology and use of audiovisual aids.

2) APPLIED GROSS ANATOMY OF HEAD AND NECK INCLUDING HISTOLOGY:

- ❖ Temporomandibular joint.
- ❖ Trigeminal nerve and facial nerve.
- ❖ Muscles of mastication.
- ❖ Tongue.
- ❖ Salivary glands.
- ❖ Nerve supply; blood supply, lymphatic drainage and venous drainage of Oro dental tissues.
- ❖ Embryology
 - Development of face, palate, mandible, maxilla, tongue Salivary gland and applied aspects of the same.
 - Development of teeth and dental tissues and developmental defects of oral and maxillofacial region and abnormalities of teeth.
- ❖ Maxillary sinus.

- ❖ Jaw muscles and facial muscles.

GENETICS:

Introduction modes of inheritance, chromosomal anomalies of oral tissues and single gene disorders.

APPROACH:

- ❖ To be covered as didactic lectures.
- ❖ Posting in department of anatomy for dissection of head, face and neck.

3. PHYSIOLOGY (GENERAL AND ORAL):

- ❖ Saliva
- ❖ Pain
- ❖ Mastication
- ❖ Taste
- ❖ Deglutition
- ❖ Wound healing
- ❖ Vitamin (Influence on growth, development and structure of oral soft and hard tissues and paraoral tissues.)
- ❖ Calcium Metabolism.
- ❖ Theories of mineralization.
- ❖ Tooth eruption and shedding.
- ❖ Hormones. (Influence on growth, development and structure of oral soft and hard tissues and Para oral tissues).
- ❖ Blood and its constituents.

APPROACH:

To be covered as didactic lectures.

4. CELL BIOLOGY:

- ❖ Cell – structure and function (ultrastructural and molecular aspects), intercellular junctions, cell cycle and division, cell cycle regulators, cell – cell and cell – extra cellular matrix interactions.
- ❖ Detailed molecular aspects of DNA, RNA, and intracellular organelles, transcription and translation and molecular biology techniques.

APPROACH:

To be covered as seminars and didactic lectures.

5. GENERAL HISTOLOGY:

Light and electron microcopy considerations of Epithelial tissues and glands, bone, hematopoietic system, lymphatic system, muscle, neural tissue, endocrinal system (thyroid, pituitary, parathyroid).

APPROACH:

- ❖ Topics to be covered as didactic lectures.
- ❖ Postings in the department of anatomy and histology for slide discussion.
- ❖ Record book to be maintained.

6. BIOCHEMISTRY:

- ❖ Chemistry of carbohydrates, lipids and proteins.
- ❖ Methods of identification and purification.
- ❖ Metabolism of carbohydrates, lipids and proteins.
- ❖ Biological oxidation.
- ❖ Various techniques – cell fractionation and ultra filtration, centrifugation, Electrophoresis, Spectrophotometry, and radioactive techniques.

APPROACH:

- ❖ Topics to be covered as didactic lectures.
- ❖ Postings in the department of biochemistry to familiarize with various techniques.
- ❖ Record book to be maintained.

7) GENERAL PATHOLOGY:

- ❖ Inflammation and chemical mediators, thrombosis, embolism, necrosis, Ischemia, repair, degeneration, shock, hemorrhage pathogenic mechanisms at molecular level and blood dyscrasias, Carcinogenesis and Neoplasia.

Approach:

To be covered as seminars and didactic lectures.

8) GENERAL MICROBIOLOGY:

- ❖ Definition of various types of infections.
- ❖ Routes of infection and spread
- ❖ Sterilization, disinfection and antiseptics.
- ❖ Bacterial genetics.
- ❖ Physiology and growth of microorganisms.
- ❖ Culture media & techniques.

Approach:

- ❖ To be covered as seminars and didactic lectures.
- ❖ Record book to be maintained.

9) BASIC IMMUNOLOGY:

- ❖ Basic principles of immunity, antigen and antibody reactions.
- ❖ Cell mediated immunity and Humoral immunity.
- ❖ Immunology of hypersensitivity.
- ❖ Immunological basis of the autoimmune phenomena.
- ❖ Immunodeficiency with relevance to opportunistic infections.
- ❖ Basic principles of transplantation and tumor immunity.

Approach:

To be covered as didactic lectures.

10) SYSTEMIC MICROBIOLOGY / APPLIED MICROBIOLOGY:

Morphology, classification, pathogenicity, mode of transmission, methods of prevention, collection and transport of specimen, for laboratory diagnosis, staining methods, common culture media, interpretation of laboratory reports and antibiotic sensitivity tests.

- ❖ Staphylococci
- ❖ Streptococci
- ❖ Corynebacterium diphtheria
- ❖ Mycobacteria
- ❖ Clostridia, bacteroides and fusobacteria
- ❖ Actinomycetales
- ❖ Spirochetes

Virology:

General properties: structure, broad classification of viruses, pathogenesis, pathology of viral infections.

Herpes virus: List of viruses included, lesions produced, pathogenesis, latency principles and laboratory diagnosis.

Hepatitis virus: List of viruses, pathogenesis, and mode of infection, list of diagnostic tests, and their interpretations, methods of prevention and control.

Human Immunodeficiency virus: Structure with relevance to laboratory diagnosis, type of infection, laboratory tests and their interpretation, universal precautions, specific precautions and recent trends in diagnosis and prophylaxis.

Mycology:

- ❖ General properties of fungi, classification bases on disease, superficial, subcutaneous, deep opportunistic infections.
- ❖ General principles of fungal infections, diagnosis rapid diagnosis method of collection of sample and examination for fungi.

Approach:

- ❖ To be covered as seminars and didactic lectures
- ❖ Postings to the dept. of microbiology to familiarize with relevant diagnostic methods
- ❖ Record book to be maintained

11) ORAL BIOLOGY (ORAL DENTAL HISTOLOGY):

- ❖ Structure and function of oral, dental and Paraoral tissues including their ultra structure, molecular and biochemical aspects.
- ❖ Study of morphology of permanent and deciduous teeth (Lectures and practical demonstrations to be given by PG students).

Approach:

- ❖ To be covered as seminars and didactic lectures.
- ❖ Slide discussion on appearance of normal oral tissues.
- ❖ Record book to be maintained.

12) BASIC MOLECULAR BIOLOGY AND TECHNIQUES:

Experimental aspects – DNA extraction, PCR, western blotting, ELISA.

APPROACH:

- ❖ To be covered as didactic lectures
- ❖ Posting in centers where facilities are available for demonstration of routine molecular biology techniques.
- ❖ Record book to be maintained.

13) BASIC HISTO TECHNIQUES AND MICROSCOPY:

- ❖ Routine hematological tests and clinical significance of the same.
- ❖ Biopsy procedures for oral lesions.
- ❖ Processing of tissues for Paraffin lesions.
- ❖ Microtome and principles of microtomy.
- ❖ Routine stains, principles and theories of microscopy.
- ❖ Microscope, principles and theories of microscopy.
- ❖ Light microscopy and various other types including electron microscopy.
- ❖ Methods of tissue preparation for ground sections, decalcified sections.

Approach:

- ❖ Topics to be covered as seminars.
- ❖ Preparation of ground and decalcified sections, tissue processing, sectioning and staining.
- ❖ Record book to be maintained.

ACADEMIC ACTIVITIES:

- ❖ Submission of synopsis of dissertation at the end of six months.
- ❖ Journal clubs and seminars to be presented by every post graduate students twice a month.
- ❖ To attend interdepartmental meetings.
- ❖ To attend dental camps based on the survey to be done.
- ❖ Part – I year ending examination to be conducted by the college.

SECOND YEAR:

ORAL PATHOLGY:

- ❖ Developmental defects of oral and maxillofacial region and abnormalities of teeth.
- ❖ Dental caries (Introduction, Epidemiology, microbiology, cariogenic bacterial including properties, acid production in plaque, development of lesion, response of dentine – pulp unit, histopathology, root caries, sequelae and immunology).
- ❖ Pulpal and Periapical diseases
- ❖ Infections of oral and Para oral regions (bacterial, viral and fungal infections).
- ❖ Non – neoplastic disorders of salivary glands.
- ❖ Bone pathology.
- ❖ Hematological disorders.
- ❖ Physical and chemical injuries, allergic and Immunological disease.
- ❖ Cysts & Tumors of Odontogenic origin.
- ❖ Dermatologic diseases.
- ❖ Periodontal diseases.
- ❖ Oral manifestations of systemic diseases.
- ❖ Facial pain and neuromuscular disorders including TMJ disorders.
- ❖ Regressive alterations of teeth.

CLINICAL PATHOLOGY:

- ❖ Laboratory investigations – Hematology, Microbiology and Urine analysis.
- ❖ Postings to Clinical Pathology for relevant training.
- ❖ Record book to be maintained.

SPECIALIZED HISTOTECHNIQUES AND SPECIAL STAINS:

- ❖ Special staining techniques for different tissues.
- ❖ Immunohistochemistry, Immuno fluorescence & other advanced diagnostic techniques.
- ❖ Preparation of frozen sections and cytological smears

Approach:

- ❖ Training to be imparted in the department in the department or in other institutions having the facility.
- ❖ Record book to be maintained.

RECORDING OF CASE HISTORY AND CLINICO – PATHOLOGICAL DISCUSSIONS:

Approach:

Posting to the department of Oral medicine, Diagnosis and Radiology and Oral and Maxillofacial surgery.

Record of case histories to be maintained.

DERMATOLOGY:

Study of selected mucocutaneous lesions – etiopathogenesis, pathology, clinical presentation and diagnosis.

Approach:

- ❖ Posting to the department of Dermatology of a Medical college.
- ❖ Topics to be covered as Seminars.
- ❖ Record of cases seen to be maintained.

ORAL ONCOLOGY:

Detailed study including Pathogenesis, molecular and biochemical changes of various tumors, tumor like lesions and Premalignant lesions affecting the hard and soft tissues of oral and paraoral tissues. Tumour markers.

Approach:

To be covered as seminars.

Posting to a Cancer center to amiliarize with the pathological appearances, diagnosis, radio - diagnosis and treatment modalities.

ORAL MICROBIOLOGY AND IMMUNOLOGY:

- ❖ Normal Oral microbial flora.
- ❖ Defense mechanism of the oral cavity.
- ❖ Microbiology and immunology of Dental caries and Periodontal diseases.
- ❖ Dental caries (Introduction, epidemiology, microbiology, cariogenic bacteria including properties, acid production in plaque, development of lesion, response of dentin – pulp unit, histopathology, root caries, sequelae and immunology).
- ❖ Tumor immunology.
- ❖ Infections of pulp and Periapical and periodontal tissues.
- ❖ Oral sepsis and Bacterimia.
- ❖ Microbial genetics.
- ❖ Infections of oral and Para oral regions (bacterial, viral and fungal infections).
- ❖ Auto immune disorder involving oral region.

Approach:

- ❖ To be covered as seminars.

FORENSIC ODONTOLOGY:

Legal procedures like inquest, medico – legal evidences post mortem examination of violence around mouth and neck, identification of deceased individual – dental importance.

Bite marks rugae patterns and lip prints, child abuse, age estimation sex determination.

Approach:

- ❖ To be covered as seminars.
- ❖ Posting to a Cancer center to familiarize with the pathological appearances, diagnosis, and radio – diagnosis and treatment modalities.

HISTOPATHOLOGY – SLIDE DISCUSSION:

Record book to be maintained.

LABORATORY TECHNIQUES AND DIAGNOSIS:

- ❖ Routine hematological tests and clinical significance of the same.
- ❖ Biopsy procedures for oral lesions.
- ❖ Processing of tissues for Paraffin sections.
- ❖ Microtome, principles of microtomy.
- ❖ Routine stains, principles and theories of staining techniques.
- ❖ Microscope, principles and theories of microscopy.
- ❖ Light microscopy and various other types including electron microscopy.
- ❖ Methods of tissue preparation for ground sections, decalcified sections.
- ❖ Special stains and staining techniques for different tissues.
- ❖ Immunohistochemistry.
- ❖ Preparation of frozen sections and cytological smears.

OTHER TOPICS IN ORAL PATHOLOGY:

- ❖ Detailed description of diseases affecting oral mucosa, teeth, supporting tissues & jaws.
- ❖ Cysts of the oral & Para – oral regions.
- ❖ Systemic diseases affecting oral cavity.

Approach:

Seminars & Slide discussions. Record note book to be maintained. Training in histo – pathology slide reporting.

EXPERIMENTAL ASPECTS OF ORAL DISEASES:**Approach:**

Posting is desirable in Centers where animals experimentation is carried out to familiarize with laboratory techniques, upkeep & care of experimental animals.

RECENT ADVANCES IN ORAL PATHOLOGY:**Approach:**

Update of knowledge in Oral Pathology through study of recent journals & Internet browsing. Journal Clubs & Group discussions.

ACDEMIC ACTIVITIES:

- ❖ Library assignment to be submitted at the end of 6 months.
- ❖ Commencement of dissertation work.
- ❖ Journal clubs and seminars to be presented by every Post Graduate students.
- ❖ Clinico – pathological discussions once in a month by every Post Graduate students.
- ❖ To attend interdepartmental meetings.
- ❖ Lecture and practical classes and slide discussions to be taken for II BDS students in oral and dental anatomy, dental histology and oral physiology.
- ❖ Year ending examination (theory and practical) to be conducted by the college.

THIRD YEAR:

- ❖ Non – neoplastic disorders of salivary glands.
- ❖ Bone pathology.
- ❖ Physical and chemical injuries, allergic and Immunological diseases.
- ❖ Cysts of odontogenic origin.
- ❖ Oral manifestations of systemic diseases.

Approach:

To be covered as seminars.

Slide discussions of the same.

Record book to be maintained.

ACADEMIC ACTIVITIES:

- ❖ Visit to center of Animals experimentation to familiarize with Laboratory techniques, upkeep and care of animals.
- ❖ Completion of Dissertation work and submission of the same, six months before the Final Examination.
- ❖ Study of Journals, Internet Browsing, and group discussion, to update knowledge in the recent advances in oral pathology.
- ❖ Lecture and Practical demonstrations for third B.D.S students in Oral Pathology and Microbiology.
- ❖ Reporting of histopathology slides.
- ❖ Journal clubs and Seminars to be presented by every post graduate students twice a month.
- ❖ Clinico – pathological discussions by every student once in a month.
- ❖ To attend Inter – departmental meeting.

MONITORING LEARNING PROGRESS:

It is essential to monitor the Learning progress to each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects.

SCHEME OF EXAMINATION:

A. THEORY : 400 MARKS

Written examination shall consist of four question paper each of three hours duration. Total marks for each paper will be 100. Paper I, II and III shall consist of two long question carrying 20 marks each and 6 short essay question each carrying 10marks. Paper IV will be on Essay. Question on recent advances may be asked in any or the papers. Distribution of topics for each paper will be as follows: *

Paper I: Applied Basic Sciences: Applied Anatomy, Physiology, (General and oral), Cell Biology, General Histology, Biochemistry, General Pathology, General and systemic Microbiology, Virology, Mycology, Basic Immunology, Oral Biology(oral and dental history), Biostatistics and Research Methodology.

Paper II: Oral pathology, Oral Microbiology & Immunology and Forensic Odontology.

Paper III: Laboratory techniques and Diagnosis and Oncology.

Paper IV: Essay

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is Inevitable Students should be prepared to answer overlapping topics.

B. Practical / Clinical Examination : 200 Marks

1. Case Presentation

- a. Long case - 20 marks
- b. Short case - 10 marks

2. Clinical Hematology (any two investigations) – 20 Marks

Hb% bleeding time, clotting time, Total WBC count, Differential WBC count and ESR

3. Smear Presentation – 20 Marks

Cytology or microbial smear and staining

4. Paraffin sectioning and H & E Staining - 30 Marks

5. Histopathology slide discussion - 100 Marks

C. Viva Voce : 100 Marks

i. Viva Voce examination: 80 Marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

ii. Pedagogy Exercise: 20 Marks

A topic be given to each candidate in the beginning of clinical examination
He/She is asked to make a presentation on the topic for 8 – 10 minutes.

BRANCH – VI
ORAL PATHOLOGY
& ORAL
MICROBIOLOGY

Legal implications of Histopathology reporting for I M.D.S. in the curriculum

Aim: This topic of legal implications is being suggested in the BOS conducted in the department. The pathologist owes the patient a duty of care and is responsible for medical malpractice. Clinicopathological conversations, involvement in quality improvement programmes, and adherence to standard operating procedures are all relevant audit practises for minimising and detecting mistakes and avoiding negative patient outcomes. There are also questions regarding the handling of specimens and papers. The aim of this addition in the syllabus is to avoid or overcome these scenarios.

SCOPE: It is helpful to consider as a practical matter what specimens or diseases traditionally put the pathologist at greatest risk for an error that results in a medical malpractice lawsuit. Wet, formalin-fixed tissues should be held until histopathological examination is complete, preferably after clinic pathological sessions, and even longer if there is a chance of litigation. Clinicopathological conversations, involvement in quality improvement programmes, and adherence to standard operating procedures are all relevant audit practises for minimising and detecting mistakes and avoiding negative patient outcomes. This covers some medical, therapeutic, and non-therapeutic uses, as well as pathology-related testing, laboratory Quality Assurance processes, industrial, and teaching.

OBJECTIVE Histopathologists face different medical-legal issues than most practitioners since they are seldom in direct contact with patients. When in doubt, good pathology practise supports consulting colleagues, but it also recommends that the treating clinician be notified if histopathological information is sent away for a second opinion.

CONTENT OF TOPIC:

- **Errors in diagnosis**
- **Documents and paper records**
- **Specimens and preparation**
- **Liability of laboratory staff**
- **Referrals to other pathologist**
- **Guidelines to reduce medical malpractice**

REVISION: Inclusion in I M.D.S.

REFERENCE:

1. Knight BH. The histopathologist and the law. In: Anthony PP, MacSween RNM, Lowe DG, Eds: Recent advances in histopathology no. 17. Edinburgh: Churchill Livingstone, 1997:233-49
2. General Orders, Chapter F, Section 1 I(a)
3. Royal College of Pathologists of Australasia. Autopsies and the use of tissues removed at autopsy. July 2000



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as deemed to be university under section 3 of UGC Act 1956, vide notification No.F.9-52000-U.3)

BACHELOR OF DENTAL SURGERY

REGULATIONS AND SYLLABUS 2017

BRANCH VIII

PAEDODONTICS & PREVENTIVE DENTISTRY

OBJECTIVES:

At the end of 3 years of training, the candidate should be able to

1. Create good oral health in the child and also a good citizen tomorrow.
2. Instill a positive attitude and behavior in children towards Dental health.
3. Understand the principles of prevention and preventive dentistry right from birth to adolescence.
4. Guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry.
5. Prevent and intercept developing malocclusion.

SKILLS:

1. Obtain proper clinical history, methodological examination of child patient, perform essential diagnostic procedures, interpret them, and arrive at a reasonable diagnosis for appropriate treatment.
2. Be competent to treat dental diseases which are occurring in child patient.
3. Repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.
4. Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.
5. To acquire skills in managing efficiently life threatening conditions with emphasis on basic life support measures.

ATTITUDES:

1. Develop an attitude to adopt ethical principles in all aspects of Paedodontic practice.
2. Professional honesty and integrity are to be fostered.
3. Treatment care is to be delivered irrespective of the social status, cast, creed, and religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues.
5. Willing to adopt, after a critical assessment, new methods and techniques of Paedodontic management developed from time to time, based on scientific research, which are in the best interest of the child patient.
6. Respect child patient's rights and privileges, including child patient's right to information and right to seek a second opinion.
7. Develop an attitude to seek opinion from allied medical and dental specialties, as and when required.

COURSE CONTENTS:

1. Applied Anatomy & genetics.
2. Applied Physiology.
3. Applied Pathology.
4. Nutrition and Dietetics.
5. Growth & Development: Prenatal and Postnatal development of cranium, face, jaws, teeth and supporting structures. Chronology of dental development and development of occlusion. Dimensional changes in dental arches. Cephalometric evaluation of growth.
6. Child Psychology: Development & Classification of behavior, personality, intelligence in children, theories of child psychology, stages of psychological child development, fear anxiety, apprehension & its management.
7. Behavior Management: Non – pharmacological & Pharmacological methods.
8. Child Abuse & Dental Neglect.
9. Conscious Sedation, Deep Sedation & General Anesthesia in Pediatric Dentistry: (Including Other Drugs, Synergic & Antagonistic Actions of Various Drugs used in Children.
10. Preventive Paedodontics: Concepts, chair side preventive measures for dental diseases, high – risk caries including rampant & extensive caries – Recognition, Features & Preventive Management, Pit and Fissures Sealants, Oral Hygiene measures, Correlation of brushing with dental caries and periodontal diseases. Diet & Nutrition as related to dental caries. Diet Counseling.
11. Dental Plaque: Definition, Initiation, Pathogenesis, Biochemistry, and Morphology & Metabolism.
12. Microbiology & Immunology as related to Oral Diseases in Children: Basic concepts, immune system in human body, Auto Immune diseases, Histopathology, Pathogenesis, Immunology of dental caries, Periodontal diseases, Tumors, Oral Mucosal lesions etc.
13. Gingival & Periodontal diseases in Children:
 - Normal Gingiva & Periodontium in children.
 - Gingival & Periodontal diseases – Etiology, Pathogenesis, Prevention & Management.
14. Pediatric Operative Dentistry
 - Principles of Operative Dentistry along with modifications of materials / past, current & latest including tooth colored materials.
 - Modifications required for cavity preparation in primary and young permanent teeth.
 - Various Isolation Techniques.
 - Restoration of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites, Silver Amalgam & latest materials (gallium).
 - Stainless steel, Polycarbonate & Resin Crowns / Veneers & fibre post systems.
15. Pediatric Endodontics:
 - a. Primary Dentition: - Diagnosis of pulp diseases and their management – Pulp capping, Pulpotomy, pulpectomy (Materials & Methods), Controversies & recent concepts.
 - b. Young permanent teeth and permanent teeth, Pulp capping, Pulpotomy, Apexogenesis, Apexification, Concepts, Techniques and Materials used for different procedures.

- c. Recent advances in Pediatric diagnosis and Endodontics.
16. Prosthetic consideration in Pediatric Dentistry.
17. Traumatic Injuries in Children:
- Classification & Importance.
 - Sequelae & reaction of teeth to trauma.
 - Management of Traumatized teeth with latest concepts.
 - Management of jaw fracture in children.
18. Interceptive Orthodontics:
- a. Concepts of occlusion and esthetics: Structure and function of all anatomic components of occlusion, mechanics of articulations, recording of masticatory function, diagnosis of Occlusal dysfunction, relationship of TMJ anatomy and pathology and related neuromuscular physiology.
 - b. A comprehensive review of the local and systemic factors in the causation of malocclusion.
 - c. Recognition and management of normal and abnormal developmental occlusions in primary, mixed and permanent dentitions in children (Occlusal Guidance).
 - d. Biology of tooth movement: A comprehensive review of the principles of teeth movement. Review of contemporary literature. Histopathology of bone and periodontal ligament, Molecular and ultra cellular consideration in tooth movement.
 - e. Myofunctional appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - f. Removable appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - g. Case selection & diagnosis in interceptive orthodontics.
 - h. Space Management: Etiology, Diagnosis of space problems, analysis, Biomechanics, Planned extraction in interceptive orthodontics.
19. Oral Habits in Children:
- Definition, Etiology & Classification
 - Clinical features of digit sucking, tongue thrusting, mouth breathing & various other secondary habits.
 - Management of oral habits in children.
20. Dental care of children with special needs:
- Definition Etiology, Classification, Behavioural, Clinical features & Management of children with:
 - Physically handicapping conditions
 - Mentally compromising conditions.
 - Medically compromising conditions.
 - Genetic disorders.
21. Oral manifestations of Systemic disorders in Children & their Management.
22. Management of Minor Oral Surgical Procedures in Children.
23. Dental Radiology as related to Pediatric Dentistry.
24. Cariology.
- Historical background.
 - Definition, Aetiology & Pathogenesis.
 - Caries pattern in primary, young permanent and permanent teeth in children.
 - Rampant caries, early childhood caries and extensive caries. Definition, aetiology, Pathogenesis, Clinical features, Complications & Management.

- Role of diet and nutrition in Dental Caries.
 - Dietary modifications & Diet counseling.
 - Subjective & Objective methods of Caries detection with emphasis on Caries Activity tests, Caries prediction, Caries susceptibility & their clinical Applications.
25. Pediatric Oral Medicine & Clinical Pathology: Recognition & Management of Developmental dental anomalies, teething disorders, stomatological conditions, mucosal lesions, viral infection etc.
 26. Congenital Abnormalities in Children: Definition, Classification, Clinical features & Management.
 27. Dental Emergencies in Children and their Management.
 28. Dental Materials used in Pediatric Dentistry.
 29. Preventive Dentistry:
 - Definition.
 - Principles & Scope
 - Types of Prevention.
 - Different preventive measures used in Pediatric Dentistry including fissure sealants and caries vaccine.
 30. Dental Health Education & School Dental Health Programmes.
 31. Dental health concepts, Effects of civilization and environment, Dental Health delivery system, Public Health measures related to children along with principles of pediatric preventive Dentistry.
 32. Fluorides:
 - Historical background.
 - Systemic & Topical fluorides.
 - Mechanism of action.
 - Toxicity & Management.
 - Defluoridation techniques.
 33. Medicolegal aspects in Paediatric Dentistry with emphasis on informed consent.
 34. Counseling in Pediatric Dentistry.
 35. Case History Recording, Outline of principles of examination, diagnosis & treatment planning.
 36. Epidemiology: Concepts, Methods of recording & evaluation of various oral diseases. Various national & global trends of epidemiology of oral diseases.
 37. Comprehensive Infant Oral Health Care.
 38. Principles of Bio – Statistics & Research Methodology & Understanding of Computers and Photography.
 39. Comprehensive cleft care management with emphasis on counseling, feeding, nasoalveolar bone remodeling, speech rehabilitation.
 40. Setting up of Paedodontics & Preventive Dentistry Clinic.
 41. Emerging concepts of Dentistry of scope of laser / minimal intervention procedures: Pediatric Dentistry.

FIRST YEAR

Preclinical Work

(Duration – first 6 Months of First Year MDS)

1. Carving of all deciduous teeth
2. Basic wire bending exercises
3. Fabrication of
 - a. Maxillary bite plate / Hawley's
 - b. Maxillary expansion screw appliance
 - c. Canine retractor appliance
 - d. All habit breaking appliances
 - i. Removable type
 - ii. Fixed type
 - iii. Partially fixed and removable
 - e. Two Myofunctional appliances
 - f. Making of inclined plane appliance.
 - g. Feeding appliances
4. Basic soldering exercise I – making of a lamppost of stainless steel wire pieces of different gauges soldered on either side of heavy gauge main post.
5. Fabrication of space maintainers
 - a) Removable type-
 - Unilateral Non – Functional space maintainer
 - Bilateral Non - Functional space maintainer
 - Unilateral functional space maintainer
 - Bilateral functional space maintainer
 - b) Space Regainers-
 - Hawley's appliances with Helical space regainer
 - Removable appliance with Slingshot space regainer
 - Removable appliance with Dumbell space regainer
 - Gerber space regainer.
 - c) Fixed Space maintainers
 - Band & long loop space maintainer.
 - Band & short loop space maintainer
 - Mayne's space maintainer.
 - Transpalatal arch space maintainer.
 - Nance Palatal holding arch
 - Nance Palatal holding arch with canine stoppers.
 - Distal shoe appliance
6. Basics for spot welding exercise
7. Collection of extracted deciduous and permanent teeth
 - a) Sectioning of the teeth at various levels and planes
 - b) Drawing of section and shapes of pulp

- c) Phantom Head Excercises: Performing ideal cavity preparation for various restorative materials for both Deciduous and permanent teeth.
- d) Performing pulpotomy, root canal treatment and Apexification procedure
 - I. Tooth preparation and fabrication of various temporary and permanent restorations on fractured anterior teeth.
 - II. Preparation of teeth for various types of crowns
 - III. Laminates / Veneers
 - IV. Bonding & banding exercise
- 8. Performing of behavioral rating and IQ tests for children.
- 9. Computation of :-
 - a) Caries index and performing various caries activity tests.
 - b) Oral Hygiene Index
 - c) Periodontal Index
 - d) Fluorosis Index
- 10. Surgical Exercises :
 - a. Fabrication of splints
 - b. Types of Wiring
 - c. Suturing
- 11.
 - A. Taking of periapical, occlusal, bitewing radiographs of children
 - b. Developing and processing of films
 - c. Tracing of soft tissue dental and skeletal landmarks as observed on Cephalometric radiographs and drawing of various planes and angles, further interpretation of cephalometric radiographic analysis.
 - d. Mixed dentition cast analysis.
- 12. Library dissertation.
- 13. Synopsis.

Clinical Work Requirements from 7 to 36 Months

The following is the minimum requirement to be completed before the candidate can be considered eligible to appear in the final M.D.S Examinations:

NO.	Clinical Work	Total	7 To 12 Months	13 To 24 Months	25 To 36 Months
1.	Behavior Management of different age group children with complete records.	17	2	10	5
2.	Detailed Case evaluation with complete records, treatment planning and presentation of cases with chair side and discussion.	17	2	10	5
3.	Step – by – step chair side preventive dentistry scheduled for high risk children with gingival and periodontal diseases & Dental Caries.	11	1	5	5
4.	Practical application of Preventive	7	1	4	2

	dentistry concepts in a class of 35 – 50 children & Dental Health Education & Motivation.				
5.	Pediatric Operative Dentistry with application of recent concepts. (a) Management of Dental Caries				
	I. Class I	50	30	10	10
	II. Class II	100	40	50	10
	III. Other Restorations	100	20	50	30
	(b) Management of traumatized anterior teeth.	15	04	06	05
	(c) Aesthetic Restorations	25	05	10	10
	(d) Pediatric Endodontic Procedures - Deciduous teeth Pulpotomy/Pulpectomy - Permanent Molars - Permanent Incisor - Apexification & Apexogenesis	150 20 15 20	30 03 02 02	50 07 03 08	70 10 10 10
6.	Stainless Steel Crowns	50	10	20	20
7.	Other Crowns	05	01	02	02
8.	Fixed: Space Maintainers & Habit breaking appliances	30	08	12	10
9.	Removable : Space Maintainers & Habit breaking appliances	20	05	07	08
10	Functional Appliances	05	01	02	02
11.	Preventive measure like fluoride applications & Pit & Fissure Sealant applications with complete follow – up and diet counseling.	20	08	08	04
12	Special Assignments				
	i. School Dental health Programmes	03	01	01	01
	ii. Camps etc.,	02	01	01	-

14. Library usage

15. Laboratory usage

16. Continuing Dental Health Programme.

(The figures given against Sl.NO. 4 to 12 are the minimum number of recommended procedures to be performed).

MONITORING LEARNING PROGRESS:

It is essential to monitor the Learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

SCHEME OF EXAMINATION:

A. THEORY : 400 MARKS

Written examination shall consist of four question papers each of three hours duration. Total marks for each paper will be 100. Paper I, II and III shall consist of two long questions carrying 20 marks each and 6 short essay questions each carrying 10 marks. Paper IV will be on Essay. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows: *

Paper I: Applied Basic Sciences: Applied Anatomy, Physiology, Pathology, Microbiology, Nutrition & Dietetics, Growth & Development , Dental plaque, Genetics.

Paper II: Clinical Paedodontics.

- 1) Conscious sedation, Deep Sedation & General Anesthesia in Pediatric Dentistry.
- 2) Gingival & Periodontal Diseases in Children.
- 3) Pediatric Operative Dentistry.
- 4) Pediatric Endodontics.
- 5) Traumatic Injuries in Children.
- 6) Interceptive Orthodontics.
- 7) Oral Habits in children.
- 8) Dental Care of Children with special needs.
- 9) Oral Manifestations of Systemic Conditions in Children & their Management.
- 10) Management of Minor Oral Surgical Procedures in Children.
- 11) Dental Radiology as Related to Pediatric Dentistry.
- 12) Pediatric Oral Medicine & Clinical Pathology.
- 13) Congenital Abnormalities in Children.
- 14) Dental Emergencies in Children & their Management.
- 15) Dental Materials Used in Pediatric Dentistry.
- 16) Case History Recording.
- 17) Setting up of Paedodontics & Preventive Dentistry Clinic.

Paper III: Preventive and Community Dentistry as applied to Pediatric Dentistry.

1. Child Psychology.
2. Behavior Management.
3. Child Abuse & Dental Neglect.
4. Preventive Paedodontics.

5. Cariology.
6. Preventive Dentistry.
7. Dental Health Education & School Dental Health Programmes.
8. Fluorides.
9. Epidemiology.
10. Comprehensive Infant Oral Health Care / Comprehensive cleft care.
11. Principles of Bio – Statistics & Research Methodology & Understanding of Computers and Photography.

Paper IV: Essay

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is Inevitable. Students should be prepared to answer overlapping topics.

B. Practical Examination : 200 Marks

The Clinical/Practical and Viva – Voce Examination are conducted for a minimum of two days.

First Day:

1. Case Discussion, Pulp Therapy i.e. Pulpectomy on a Primary Molar.

Case Discussion : 20 marks

Rubber Dam application : 10 marks

Working length X – ray : 20 marks

Obturation : 20 marks

Total 70 marks

2. Case Discussion, Crown preparation on a Primary Molar for Stainless steel crown and cementation of the same.

Case discussion : 10 marks

Crown Preparation : 20 marks

Crown selection and Cementation : 20 marks

Total 50 marks

3. Case Discussion, band adaptation for fixed type of space maintainer and impression making.

Case discussion : 20 marks

Band adaptation : 20 marks

Impression : 20 marks

Total

60 marks

Second Day:

1. Evaluation of Fixed Space Maintainer and Cementation : 20 marks

C. Viva Voce : 100 Marks

I. Viva – Voce examination : 80 marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

II. Pedagogy Exercise: 20 marks

A topic will be given to each candidate in the beginning of clinical examination. He / She is asked to make a presentation on the topic for 8 – 10 minutes.

BRANCH VIII

PAEDODONTICS

& PREVENTIVE DENTISTRY

Department of Pedodontics and Preventive Dentistry

Sree Balaji Dental College & Hospital

Board of Studies – Addition of New Syllabus to the Under-Graduates

Topic: Silver Diamine Fluoride (SDF) in Pediatric Dentistry

Aims:

To improve the Knowledge and Awareness about SDF in Pediatric Dentistry

Objectives:

1. Materials with property of preventing common oral diseases such as dental caries are taught with extreme importance.
2. Thorough knowledge about the composition, Biocompatibility, Indications, Contraindications, applicability of the SDF introduced by the multinational and Indian companies
3. Manipulation skills which are indicated by the various companies is thought so that the property of the material can be completely utilized

Scope:

1. By knowing about the properties, composition and manipulation as indicated by the manufacturer specific indications for common dental diseases can be undertaken at various extremely demanding clinical situations. Eg. Early Childhood Caries

Content:

- I. Materials
 - a. Introduction
 - b. Composition
 - c. Indications
 - d. Contra-Indications

- e. Biocompatibility
- f. Special Instruments for Easy placement
- g. Manipulation
- h. Application
- i. SMART Technique, Finishing & Polishing

References:

1. American Academy of Pediatric Dentistry Guidelines
2. European Academy of Pediatric Dentistry Guidelines



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BACHELOR OF DENTAL SURGERY

REGULATIONS AND SYLLABUS 2017

BRANCH – IV

CONSERVATIVE DENTISTRY AND ENDODONTICS

OBJECTIVES:

The following objectives are laid out to achieve the goals of the course. These are to be achieved by the time candidate completes the course. These objectives may be considered under the following subtitles

KNOWLEDGE:

At the end of 36 months of training, the candidates should be able to:

- ❖ Describe aetiology, pathophysiology, periapical diagnosis and management of common restorative situations, endodontic situations that will include contemporary management of dental caries, management of trauma and pulpal pathoses including periodontal situation.
- ❖ Demonstrate understanding of basic sciences as relevant to conservative/restorative dentistry and Endodontics.
- ❖ Identify social, economic, environmental and emotional determinants in a given cases or community and take them into account for planning and execution at individual and community level.
- ❖ Ability to master differential diagnosis and recognize conditions that may require multi disciplinary approach or a clinical situation outside the realm of the specialty, which he or she should be able to recognize and refer to appropriate specialist.
- ❖ Update himself by self – study and by attending basic and advanced courses, conferences, seminars, and workshops in the specialty of Conservative Dentistry – Endodontics – Dental Materials and Restorative Dentistry.
- ❖ Ability to teach/guide, colleagues and other students.
Use information technology tools and carry out research both basic and clinical with the aim of his publishing his work and presenting the same at scientific platform.

SKILLS:

- ❖ Take proper chair side history, exam the patient and perform medical and dental diagnostic procedures and order as well as perform relevant tests and interpret to them to come to a reasonable diagnosis about the dental condition in general and Conservative Dentistry – Endodontics in particular. And undertake complete patient monitoring including preoperative as well as post operative care of the patient.
- ❖ Perform all levels of restorative work and surgical and non – surgical Endodontics including endodontic endosseous implants, as well as endodontic – periodontal surgical procedures as part of multidisciplinary approach to clinical condition.
- ❖ Provide basic life saving support in emergency situations.
- ❖ Manage acute pulpal and pulpo periodontal situations.
- ❖ Have a thorough knowledge of infection control measures in the dental clinical environment and laboratories.

HUMAN VALUES, ETHICAL PRACTICE AND COMMUNICATION ABILITIES

- ❖ Adopt ethical principles in all aspects of restorative and contemporaries Endodontics including non – surgical and surgical Endodontics.
- ❖ Professional honesty and integrity should be the top priority.
- ❖ Dental care has to be provided regardless of social status, caste, creed or religion of the patient.
- ❖ Develop communication skills in particular to explain various options available management and to obtain a true informed consent from the patient.
- ❖ Apply high moral and ethical standards while carrying on human or animal research.
- ❖ He/She shall not carry out any heroic procedures and must know his limitations in performing all aspects of restorative dentistry including Endodontics. Ask for help from colleagues or seniors when required without hesitation

- ❖ Respect patient's rights and privileges including patients right to information.

COURSE CONTENTS:

PAPER – I: APPLIED ANATOMY OF HEAD AND NECK

- ❖ Development of face, paranasal sinuses and the associated structure and their anomalies, cranial and facial bones, TMJ anatomy and function, arterial and venous drainage of head and neck, muscles of face and neck including muscles of mastication and deglutition, brief consideration of structures and function of brain. Brief consideration of all cranial nerves and autonomic nervous system of head and neck Salivary glands, Functional anatomy of mastication, deglutition and speech. Detailed anatomy of deciduous and permanent teeth, general consideration in physiology of permanent dentition, form, function, alignment, contact, occlusion.
- ❖ Internal anatomy of permanent teeth and its significance
- ❖ Applied histology – histology of skin, oral mucosa, connective tissue, bone cartilage, blood vessels, lymphatics, nerves, muscles, tongue.

DEVELOPMENT OF TEETH:

- ❖ Enamel – development and composition, physical characteristics, chemical properties, structure
- ❖ Age changes – clinical structure
- ❖ Dentin – development, physical and chemical properties, structure type of dentin, innervations, age and functional changes.
- ❖ Pulp – development, histological structures, innervations, functions, regressive changes, clinical considerations.
- ❖ Cementum – composition, cementogenesis, structure, functions, clinical consideration.
- ❖ Periodontal ligament – development, structure, function and clinical consideration.
- ❖ Salivary glands – structure, function, clinical considerations.
- ❖ Eruption of teeth.

APPLIED PHYSIOLOGY:

- ❖ Mastication, deglutition, digestion and assimilation, fluid and electrolyte balance.
- ❖ Blood composition, volume, function, blood groups, haemostasis, coagulation, blood transfusion, circulation, heart, pulse, blood pressure, shock, respiration, control, anoxia, hypoxia, asphyxia, artificial respiration, and endocrinology – general principles of endocrine activity and disorders relating to pituitary, thyroid, parathyroid, adrenals including pregnancy and lactation.
- ❖ Physiology of saliva – composition, function, clinical significance.
- ❖ Clinical significance of vitamins, diet and nutrition – balanced diet.
- ❖ Physiology of pain, sympathetic and Para sympathetic nervous system, pain pathways, Physiology of pulp pain, Odontogenic and non Odontogenic pain, pain disorders – typical and atypical, biochemistry such as osmotic pressure, electrolytic dissociation, oxidation, reduction etc. Carbohydrates, proteins, lipids and their metabolism, nucleoproteins, nucleic acid and their metabolism. Enzymes, vitamins and minerals, metabolism of inorganic elements, detoxification in the body, anti metabolites, chemistry of blood lymph and urine.

PATHOLOGY:

- ❖ Inflammation, repair, degeneration, necrosis and gangrene.
- ❖ Circulatory disturbances – ischemia, hyperemia, edema, thrombosis, embolism, infarction, allergy and hypersensitivity reaction.
- ❖ Neoplasms – classifications of tumors, characteristics of benign and malignant tumors, spread of tumors.
- ❖ Blood dyscrasias.
- ❖ Developmental disturbances of oral and Para oral structures, dental caries, regressive changes of teeth, pulp, Periapical pathology, pulpal reaction to dental caries and dental procedures.
- ❖ Bacterial, viral, mycotic infections of the oral cavity.

MICROBIOLOGY:

- ❖ Pathways of pulpal infection, oral flora and micro organisms associated with endodontic diseases, pathogenesis, host defense, bacterial virulence

factors, healing, theory of focal infections, microbes of relevance to dentistry – strepto, staphylococci, lactobacilli, corneobacterium, actinomyces, clostridium, neisseria, vibrio, bacteroids, fusobacteria, Spirochetes, mycobacterium, virus and fungi.

- ❖ Cross infection, infection control, infection control procedure, sterilization and disinfection.
- ❖ Immunology – antigen antibody reaction, allergy hypersensitivity and anaphylaxis, auto immunity, grafts, viral hepatitis, HIV infections and AIDS. Identification and isolation of microorganisms from infected root canals. Culture medium and culturing technique (Aerobic and anaerobic interpretation and antibiotic sensitivity test).

PHARMACOLOGY:

- ❖ Dosage and route of administration of drugs, actions and fate of drugs in body, drug addiction, tolerance of hypersensitivity reactions.
- ❖ Local anesthesia – agents and chemistry, pharmacological actions, fate and metabolism of anaesthetic, ideal properties, techniques and complications.
- ❖ General anesthesia – pre medications, neuro muscular blocking agents, induction agents, inhalation anesthesia, and agents used, assessment of anesthetic problems in medically compromised patients.
- ❖ Anesthetic emergencies.
- ❖ Antihistamines, corticosteroids, chemotherapeutic and antibiotics, drug resistance, haemostasis, and haemostatic agents, anticoagulants, sympathomimetic drugs, vitamins and minerals (A, B, C, D, E, K, iron), anti sialogogue, immunosuppressants, drug interactions, antiseptics, disinfectants, anti viral agents, drugs acting on CNS.

BIOSTATISTICS:

- ❖ Introduction, Basic concepts, Sampling, Health information systems – collection, compilation, presentation of data. Elementary statistical methods - presentation of statistical data, Statistical averages – measures of central tendency, measures of dispersion, Normal distribution. Test of significance – parametric and non – parametric tests (Fisher exact test,

Sign test, Median test, Mann Whitney test, Kruskal Wallis one way analysis, Friedmann two way analysis, Regression analysis), Correlation and regression, Use of computers.

RESEARCH METHODOLOGY:

- ❖ Essential features of a protocol for research in humans.
- ❖ Experimental and non – experimental study designs.
- ❖ Ethical considerations of research.

APPLIED DENTAL MATERIALS:

- ❖ Physical and mechanical properties of dental materials, biocompatibility.
- ❖ Impression materials, detailed study of various restorative materials, restorative resin and recent advances in composite resins, bonding – recent developments – tarnish and corrosion, dental amalgam, direct filling gold, casting alloys, inlay wax, die materials, investments, casting procedures, defects, dental cements for restoration and pulp protection (liners, bases) cavity varnishes.
- ❖ Dental ceramics – recent advances, finishing and polishing materials.
- ❖ Dental burs – and mechanics of cutting – other modalities of tooth preparation.
- ❖ Methods of testing biocompatibility of materials used.

PAPER – II : CONSERVATIVE DENTISTRY

1. Examination, diagnosis and treatment plan.
2. Occlusion as related to conservative dentistry, contact, contour, its significance. Separation of teeth, matrices, used in conservative dentistry.
3. Dental caries – epidemiology, recent concept of etiological factors, pathophysiology, Histopathology, diagnosis, caries activity tests, prevention of dental caries and management – recent methods.
4. Hand and rotary cutting instruments, development of rotary equipment, speed ranges, hazards.
5. Dental burs and other modalities of tooth preparation – recent development (air abrasions, lasers etc).

6. Infection control procedures in conservative dentistry, isolation equipments etc.
7. Direct concepts in tooth preparation for amalgam, composite, GIC and restorative techniques, failure and management.
8. Direct and indirect composite restorations.
9. Indirect tooth colored restorations – ceramic, inlays and onlays, veneers, crowns, recent advances in fabrication and materials.
 - a. Tissue management.
10. Impression procedures used for indirect restorations.
11. Cast metal restorations, indications, contraindications, tooth preparation for class 2 inlay, Onlay full crown restorations.
Restoration techniques, direct and indirect methods of fabrication including materials used for fabrication like inlay wax, investment materials.
12. Direct gold restorations.
13. Recent advances in restorative materials and procedures.
14. Management of non – carious lesion.
15. Advanced knowledge of minimal intervention dentistry.
16. Recent advances in restoration of endodontically treated teeth and grossly mutilated teeth.
17. Hypersensitivity, theories, causes and management.
18. Lasers in Conservative Dentistry.
19. CAD – CAM & CAD – CIM in restorative dentistry.
20. Dental imaging and its applications in restorative dentistry (clinical photography).
21. Principles of esthetics.
 - Color
 - Facial analysis
 - Smile design
 - Principles of esthetic integration
 - Treatment planning in esthetic dentistry

PAPER – III : ENDODONTICS

1. Rationale of endodontics.
2. Knowledge of internal anatomy of permanent teeth, anatomy of root apex and its implications in endodontic treatment.
3. Dentin and pulp complex.
4. Pulp and periapical pathology.
5. Pathobiology of periapex.
6. Diagnostic procedure – recent advances and various aids used for diagnosis-
 - a. Orofacial dental pain emergencies: endodontic diagnosis and management.
7. Case selection and treatment planning.
8. Infection control procedures used in Endodontics (aseptic techniques such as rubber dam, sterilization of instruments etc).
9. Access cavity preparation – objectives and principles.
10. Endodontic instruments and instrumentation – recent developments, detailed description of hand, rotary, sonic, ultra sonic etc.
11. Working length determination / cleaning and shaping of root canal system and recent development in techniques of canal preparation.
12. Root canal irrigants and intra canal medicaments used including non – surgical Endodontics by calcium hydroxide.
13. Endodontic microbiology.
14. Obturating materials, various obturation techniques and recent advances in obturation of root canal.
15. Traumatic injuries and management – endodontic treatment for young permanent teeth. Pediatric Endodontics – treatment of immature apex.
16. Endodontic surgeries, recent development in technique and devices, endosseous endodontic implants – biology of bone and wound healing.
17. Endo-perio interrelationship, endo + Perio lesion and management.
18. Drugs and chemical used in Endodontics.
19. Endo emergencies and management.
20. Restoration of endodontically treated teeth, recent advances.

21. Geriatric Endodontics.
22. Biologic response of pulp to various restorative materials and operative procedures.
23. Lasers in Endodontics.
24. Multidisciplinary approach to endodontics situations.
25. Endodontics radiology – digital technology in endodontics practice.
26. Local anesthesia in endodontics.
27. Procedural errors in endodontics and their management.
28. Endodontics failures and retreatment.
29. Resorptions and its management.
30. Microscopes in endodontics.
31. Single visit endodontics, current concepts and controversies.
32. Management of discolored teeth.

TEACHING / LEARNING ACTIVITIES:

The following is the minimum required to be completed before the candidate can be considered eligible to appear for final MDS exam.

First Year

Pre Clinical Work – Operative and Endodontics

Preclinical work on typhodont teeth

1. Class 2 amalgam cavities
 - a. Conservative preparation - 03
 - b. Conventional preparation - 03
2. Inlay cavity preparation on premolars
And molars – MO, DO MOD - 10
 - a. Wax pattern - 06
 - b. Casting - 04
3. Onlay preparation on molars - 02

- a. Casting - 01
- 4. Full Crown
 - a. Anterior - 05
 - b. Posterior - 05
 - (2 each to be processed)
- 5. 7/8 crown - 02
 - (1 to be processed)
- 6. 3 / 4 crown premolars - 02
 - (1 to be processed)

Pre Clinical Work on natural teeth

- 1. Composite resin restoration - 10
 - a. Class I - 02
 - b. Class II - 02
 - c. Class III - 02
 - d. Class IV - 02
 - e. Class V - 02
- 2. Inlay on molars and premolars MO,DO, and MOD - 08
 - a. Casting - 02
 - b. Wax pattern - 02
- 3. Amalgam cavity preparation
 - a. Conventional - 02
 - b. Conservative - 02
- 4. Pin retained amalgam on molar teeth - 02
- 5. Post and core build up
 - a. Anterior teeth - 10
 - b. Posterior teeth - 05
- 6. Casting
 - a. Anterior - 04
 - b. Posterior - 02

7. Onlay on molars (1 to be processed)	- 03
8. Full crown premolars and molars (2 to be processed)	- 04
9. Full crown anterior (3 to be processed)	- 06
10. Veneers anterior teeth (indirect method)	- 02
11. Composite inlay (class 2) (1 to be processed)	- 03
12. Full tooth wax carving – all permanent teeth	

ENDODONTICS:

1. Sectioning of all maxillary and mandibular teeth.
2. Sectioning of teeth – in relation to deciduous molar, 2nd primary upper and lower molar 1 each
3. Access cavity opening and root canal therapy in relation to maxillary and mandibular permanent teeth
4. Access cavity preparation and BMP
 - Anterior
 - a. Conventional prep
 - b. Step back
 - c. Crown down
 - d. Obturation 03
5. BMP Premolar 06 (2 upper and 2 lower) obturation 1 each
6. BMP Molar 06 (3 upper – 2 first molars and 1 second molar, 3 lower - 2 first molars and 1 second molar) obturation 1 each.
7. Post and core preparation and fabrication in relation to anterior and posterior teeth
 - a. Anterior 10 (casting 4)
 - b. Posterior 05 (casting 2)
8. Removable dies 04

Note : Technique work to be completed in the first four months

CLINICAL WORK:

A	Composite restorations	30
B	GIC Restorations	30
C	Complex amalgam restorations	05
D	Composite inlay + veneers (direct and indirect)	05
E	Ceramic jacket crowns	05
F	Post and core for anterior teeth	05
G	Bleaching vital	05
	Non vital	05
H	RCT Anterior	20
I	Endo surgery – observation and assisting	05

Presentation of:

- ◆ Seminars – 5 seminars by each student – should include topics in dental materials, conservative dentistry and endodontics
- ◆ Journal clubs – by each student
- ◆ Submission of synopsis at the end of 6 months
- ◆ Library assignment work
- ◆ Internal assessment – theory and clinical.

Second Year

Case discussion – 5

1	Ceramic jacket crowns	10
2	Post and core for anterior teeth	10
3	Post and core for posterior teeth	05
4	Composite restoration	05
5	Full crown for posterior teeth	15
6	Cast gold inlay	05
7	Other special types of work such as splinting Reattachment of fracture teeth etc.	05

8	Anterior RCT	20
9	Posterior RCT	30
10	Endo surgery performed independently	05
11	Management of endo – Perio problems	05

- ◆ Under graduate teaching program as allotted by the HOD
- ◆ Seminars – 5 by each student
- ◆ Journal club – 5 by each student
- ◆ Dissertation work
- ◆ Prepare scientific paper and present in conference and clinical meeting
- ◆ Library assignment to be submitted 18 months after starting of the course
- ◆ Internal assessment – theory and clinical

THIRD YEAR

Dissertation work to be submitted 6 months before final examination.

CLINICAL WORK

- ◆ Cast gold inlay – Onlay, cuspal restoration 10
- ◆ Post and core 20
- ◆ Molar endodontics 50
- ◆ Endo Surgery 05
- ◆ All other types of surgeries including crown lengthening, perioesthetics, hemi sectioning Splinting, replantation, endodontic implants.

Presentation of:

- ◆ Seminars
- ◆ Journal club
- ◆ Teaching – lecture (under graduates)
- ◆ Internal assessment – theory and clinical

MONITORING LEARNING PROGRESS:

It is essential to monitor the Learning progress to each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be

done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

SCHEME OF EXAMINATION:

A. THEORY : 400 MARKS

Written examination shall consist of four question paper each of three hours duration. Total marks for each paper will be 100. Paper I, II and III shall consist of two long question carrying 20 marks each and 6 short essay question each carrying 10marks. Paper IV will be on Essay. Question on recent advances may be asked in any or the papers. Distribution of topics for each paper will be as follows: *

Paper I: Applied Basic Sciences: Applied Anatomy, Pathology, Microbiology, Pharmacology, Biostatistics and Research Methodology and Applied Dental Materials.

Paper II: Conservative Dentistry.

Paper III: Endodontics

Paper IV: Essay

* The topic assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is Inevitable Students should be prepared to answer overlapping topics.

B. Clinical : 200 Marks

The duration of Clinical and Viva Voce examination will be 2 days for a batch of four students. If the number of candidates exceeds 4, the programme can be extended to 3rd day.

Day 1

Clinical Exercise I - 50 Marks

Cast core preparation

- I. Tooth Preparation - 10 marks
- II. Direct Wax Pattern - 10 marks
- III. Casting - 10 marks
- IV. Cementation - 10 marks
- V. Retraction & Elastomeric Impression - 10 marks

**Clinical Exercise II - 50 Marks
(Inlay Exercise)**

- I. Tooth preparation for Class II Gold Inlay - 25 marks
- II. Fabrication of Direct Wax Pattern - 25 marks

Day 2

**Clinical exercise III - 100 Marks
(Molar Endodontics)**

- i. Local Anaesthesia and Rubber Dam application. - 20 marks
- ii. Access Cavity - 20 marks
- iii. Working length determination - 20 marks
- iv. Canal Preparation - 20 marks
- v. Master Cone selection - 20 marks

C. Voce : 100 Marks

I. Viva – Voce examination : 80 marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also

II. Pedagogy Exercise: 20 marks

A topic be given to each candidate in the beginning of clinical examination. He / She is asked to make a presentation on the topic for 8 – 10 minutes.

Day 3:

Viva – Voce (Continued if more than 4 students are taking examination or shortage of time on 2nd day)

BRANCH – IV
CONSERVATIVE
DENTISTRY AND
ENDODONTICS



Department of Conservative Dentistry & Endodontics

SYALLABUS MODIFICATION

**SREE BALAJI DENTAL COLLEGE AND
HOSPITAL
Chennai**



REQUEST LETTER TO PRINCIPAL

Chennai

20 / 4 / 2018

From

Prof . Dr. A.Subbiya, M.D.S,
The Head of the Department,
Dept of Conservative dentistry and Endodontics,
Sree Balaji Dental College and Hospital,
Bharath Institute of Higher Education and Research,
Pallikaranai, Chennai.

To

The Principal
Sree Balaji Dental College and Hospital
Bharath Institute of Higher Education and Research,
Pallikaranai, Chennai

Sub: Request for revision of PG syllabus- Reg

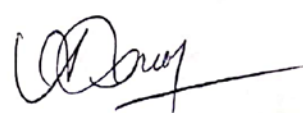
Respected Sir,

This is to bring to your kind notice that after intra-departmental meeting we have decided to include a mandatory completion of two exercises of Digital Smile Designing for MDS students as a part of the PG Curriculum from the forthcoming academic year (2019-2020).

Thanking you,

Yours sincerely,


PRINCIPAL
SREE BALAJI DENTAL COLLEGE & HOSPITAL
Velachery Main Road, Narayanapuram,
Pallikaranai, Chennai-600 100.


Prof. Dr. A. Subbiya
HEAD OF THE DEPT
Conservative Dentistry & Endodontics
Sree Balaji Dental College & Hospital
Pallikaranai, Chennai - 600 100.

Syllabus modification for MDS

Year of modification : 2019- 2020

Subject : Conservative Dentistry

Modification suggested: Mandatory completion of two exercises of Digital Smile Designing for MDS students as a part of the PG Curriculum

Objectives & Aim:

The basic objective of this suggested modification is to satisfy the patient and the outcome of the treatment is to meet the patient's expectations of enhancing their facial aesthetics and smile. DSD makes diagnosis and treatment planning more effective by providing customized treatment sequencing, reducing time and cost of the treatment.

Scope:

The digital smile designing technique motivates and educates the patient about the end result of the treatment. This enables the post-graduate students to digitally design and modify the smile of patients, allowing them to visualize it ahead of time by generating and displaying a digital mock-up of their updated smile design before the physical treatment begins.

Content :

The DSD protocol offers advantages in the following areas:

- Esthetic diagnosis
- Effective patient Communication
- Effective Feedback from the patient
- Time and Patient management

- Patient Education and motivation.^[1]

DSD WORKFLOW:-

The DSD protocol is done using Keynote software (iWork); but softwares such as Microsoft PowerPoint can be used with minor adjustments to the technique. It allows for simple manipulation of the digital images and the addition of lines, shapes, and measurements over the clinical and laboratory images.

Three basic photographic views are necessary: full face with a wide smile and the teeth apart, full face at rest, and retracted view of the full maxillary arch with teeth apart.

The photographs and videos are downloaded and inserted into the slide presentation.

The DSD workflow then proceeds as follows:

1. The cross: Two lines are placed on the center of the slide, forming a cross. The facial photograph with the teeth apart should be positioned behind these lines.
2. Digital facebow: Relating the full-face smile image to the horizontal reference line is the most important step in the smile design process. The interpupillary line is the first reference line to establish the horizontal plane, but it should not be the only one. The face as a whole must be analyzed before determining the best horizontal reference to achieve harmony. After determining the horizontal reference line, the facial midline is outlined according to facial features such as the glabella, nose, and chin.^[2]
3. Smile analysis: Dragging the horizontal line over the mouth will allow for initial evaluation of the relationship of the facial lines with the smile. Grouping the lines and the facial photographs will allow the clinician to zoom in on the image without losing the reference between the lines and photograph.^[3] Midline and occlusal plane shifting and canting can be easily detected.
4. Smile simulation: Simulations are performed to fix the incisal edge position, canting, shifting, tooth proportions, and soft tissue outline.
5. Transferring the cross to the intraoral images: To analyze the intraoral photographs in accordance with the facial references, the cross is transferred to the retracted view using three transferring lines drawn over the smile view as follows

(a) Line 1: from the tip of one canine to the tip of the contralateral canine.

b) Line 2: from the middle of the incisal edge of one central incisor to the middle of the incisal edge of the contralateral central incisor.

c) Line 3: over the dental midline, from the tip of the midline interdental papillae to the incisal embrasure.

It is necessary to calibrate four features on the photograph: size, canting, incisal edge position, and midline position. Line 1 will guide the two first aspects (size and canting), line 2 will guide the incisal edge position, and line 3 will guide the midline position.

6. Measuring tooth proportion: Measuring the width/ length proportion of the central incisors is the first step toward understanding how to best redesign the smile. A rectangle is then placed over the edges of both central incisors. The proportions of the patient's central incisors are compared to the ideal proportions described in the literature.^[4,5]

7. Tooth outline: From this step on, all drawings are performed depending on what needs to be visualized or communicated for each specific case. For example, tooth outlines can be drawn over the photograph, or premade tooth outlines can be copied and pasted. The selection of tooth shape will depend on factors such as the morpho-psychologic interview and the patient's desires, facial features, and esthetic expectations

8. White and pink esthetic evaluation: After all reference lines and drawings are provided, the clinician should have a clear understanding of the esthetic issues involved in the patient's maxillary arch, including the tooth proportions, interdental relationship, relationship between the teeth and smile line, discrepancy between facial and dental midlines, midline and occlusal plane canting, soft tissue disharmony, relationship between the soft tissues and teeth, papillae heights, gingival margin levels, incisal edge design, and tooth axis^[6]

9. Digital ruler calibration: The digital ruler are calibrated over the intraoral photograph by measuring the length of one of the central incisors on the cast and transferring this measurement to the computer. Once the digital ruler is calibrated, the clinician can make any measurements needed over the anterior area of the image

10. Transferring the cross to the cast: First, the horizontal line over the intraoral photograph should be moved above the gingival margin of the six anterior teeth. The distance between the horizontal line and the gingival margin of each tooth is measured using the digital ruler, and

these measurements are written down on the slide. The measurements are then transferred to the cast with the aid of a caliper. Pencil marks are made on the cast at the same distances above the gingival margins as shown on the digital images. Those dots are then connected, creating a horizontal line above the teeth. The next step is to transfer the vertical midline. Because the vertical line must be perpendicular to the horizontal line, only one point is necessary to determine its location. The distance between the dental midline and the facial midline at the incisal edge is measured on the computer, and the distance is then transferred to the cast with the caliper. Subsequently, the line can be drawn perpendicular to the horizontal line passing over this reference point.^[7] After drawing the cross on the cast, it is possible to transfer any necessary information, such as gingival margins, root coverage, crown lengthening, incisal edge reduction, and tooth width. At this stage, all information the technician will need to develop a precise wax-up is available on both the slides and cast. The guided diagnostic wax-up will be an important reference for any surgical, orthodontic, and restorative procedures.^[8] Several guides can be produced over this wax-up to control the procedures, such as surgical stents, orthodontic guides, implant guides, crown lengthening guides, and tooth preparation guides. The next important step to evaluate the precision of the DSD protocol and the wax-up is to perform a clinical try-in. The clinical try-in can be carried out using a direct mock-up or a provisional restoration depending on the complexity of the case. After patient approval, Tooth preparation is minimally invasive, allowing enough clearance to create proper space for ceramic restorations. Fabrication of the final restorations is a controlled process with minimal final adjustments.^[9,10]

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1. Thumati P. Evaluation of function and esthetics for creating a beautiful smile in dental practice using digital smile designing. *Journal of Interdisciplinary Dentistry*. 2014 Sep 1;4(3):144.
2. Jafri Z, Ahmad N, Sawai M, Sultan N, Bhardwaj A. Digital Smile Design-An innovative tool in aesthetic dentistry. *Journal of oral biology and craniofacial research*. 2020 Apr 1;10(2):194-8.
3. Oberoi G, Chaudhry S, Yadav S, Talwar S, Verma M. Correction of gummy smile using digital smile designing in conjugation with crown lengthening by soft-tissue diode laser. *Journal of Dental Lasers*. 2017 Jan 1;11(1):14.
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rehabilitate dental agenesis: a clinical report. RGO-Revista Gaúcha de Odontologia. 2019;67.

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6. Coachman C, Yoshinaga L, Calamita M, Sesma N. Digital smile design concepts. The Technologist. 2014.
7. Buzayan MM. The Aesthetic Smile Designing in the Digital Dentistry Era. Periodontics. 2019;5(1):48.
8. Tomer AK. Digital advancements in smile designing—a review. International Journal of Medical Science And Diagnosis Research. 2020 May 29;4(5).
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10. Sahoo KK, Sahu S, Sahu N, Sethy S. Vistas of Smile Designing. Indian Journal of Public Health Research & Development. 2018 Dec 1;9(12).

MD00PD001- PAEDODONTICS

OBJECTIVES:

At the end of 3 years of training, the candidate should be able to

1. Create good oral health in the child and also a good citizen tomorrow.
2. Instill a positive attitude and behavior in children towards Dental health.
3. Understand the principles of prevention and preventive dentistry right from birth to adolescence.
4. Guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry.
5. Prevent and intercept developing malocclusion.

SKILLS:

1. Obtain proper clinical history, methodological examination of child patient, perform essential diagnostic procedures, interpret them, and arrive at a reasonable diagnosis for appropriate treatment.
2. Be competent to treat dental diseases which are occurring in child patient.
3. Repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.
4. Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.
5. To acquire skills in managing efficiently life threatening conditions with emphasis on basic life support measures.

ATTITUDES:

1. Develop an attitude to adopt ethical principles in all aspects of Paedodontic practice.
2. Professional honesty and integrity are to be fostered.
3. Treatment care is to be delivered irrespective of the social status, cast, creed, and religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues.
5. Willing to adopt, after a critical assessment, new methods and techniques of Paedodontic management developed from time to time, based on scientific research, which are in the best interest of the child patient.
6. Respect child patient's rights and privileges, including child patient's right to information and right to seek a second opinion.
7. Develop an attitude to seek opinion from allied medical and dental specialties, as and when required.

COURSE CONTENTS:

1. Applied Anatomy & genetics.
2. Applied Physiology.
3. Applied Pathology.
4. Nutrition and Dietetics.
5. Growth & Development: Prenatal and Postnatal development of cranium, face, jaws, teeth and supporting structures. Chronology of dental development and development of occlusion. Dimensional changes in dental arches. Cephalometric evaluation of growth.
6. Child Psychology: Development & Classification of behavior, personality, intelligence in children, theories of child psychology, stages of psychological child development, fear anxiety, apprehension & its management.
7. Behavior Management: Non – pharmacological & Pharmacological methods.
8. Child Abuse & Dental Neglect.
9. Conscious Sedation, Deep Sedation & General Anesthesia in Pediatric Dentistry: (Including Other Drugs, Synergic & Antagonistic Actions of Various Drugs used in Children.
10. Preventive Paedodontics: Concepts, chair side preventive measures for dental diseases, high – risk caries including rampant & extensive caries – Recognition, Features & Preventive Management, Pit and Fissures Sealants, Oral Hygiene measures, Correlation of brushing with dental caries and periodontal diseases. Diet & Nutrition as related to dental caries. Diet Counseling.
11. Dental Plaque: Definition, Initiation, Pathogenesis, Biochemistry, and Morphology & Metabolism.
12. Microbiology & Immunology as related to Oral Diseases in Children: Basic concepts, immune system in human body, Auto Immune diseases, Histopathology, Pathogenesis, Immunology of dental caries, Periodontal diseases, Tumors, Oral Mucosal lesions etc.
13. Gingival & Periodontal diseases in Children:
 - Normal Gingiva & Periodontium in children.
 - Gingival & Periodontal diseases – Etiology, Pathogenesis, Prevention & Management.
14. Pediatric Operative Dentistry
 - Principles of Operative Dentistry along with modifications of materials / past, current & latest including tooth colored materials.
 - Modifications required for cavity preparation in primary and young permanent teeth.
 - Various Isolation Techniques.
 - Restoration of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites, Silver Amalgam & latest materials (gallium).
 - Stainless steel, Polycarbonate & Resin Crowns / Veneers & fibre post systems.
15. Pediatric Endodontics:
 - a. Primary Dentition: - Diagnosis of pulp diseases and their management – Pulp capping, Pulpotomy, pulpectomy (Materials & Methods), Controversies & recent concepts.
 - b. Young permanent teeth and permanent teeth, Pulp capping, Pulpotomy, Apexogenesis, Apexification, Concepts, Techniques and Materials used for different procedures.

- c. Recent advances in Pediatric diagnosis and Endodontics.
16. Prosthetic consideration in Pediatric Dentistry.
17. Traumatic Injuries in Children:
- Classification & Importance.
 - Sequelae & reaction of teeth to trauma.
 - Management of Traumatized teeth with latest concepts.
 - Management of jaw fracture in children.
18. Interceptive Orthodontics:
- a. Concepts of occlusion and esthetics: Structure and function of all anatomic components of occlusion, mechanics of articulations, recording of masticatory function, diagnosis of Occlusal dysfunction, relationship of TMJ anatomy and pathology and related neuromuscular physiology.
 - b. A comprehensive review of the local and systemic factors in the causation of malocclusion.
 - c. Recognition and management of normal and abnormal developmental occlusions in primary, mixed and permanent dentitions in children (Occlusal Guidance).
 - d. Biology of tooth movement: A comprehensive review of the principles of teeth movement. Review of contemporary literature. Histopathology of bone and periodontal ligament, Molecular and ultra cellular consideration in tooth movement.
 - e. Myofunctional appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - f. Removable appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - g. Case selection & diagnosis in interceptive orthodontics.
 - h. Space Management: Etiology, Diagnosis of space problems, analysis, Biomechanics, Planned extraction in interceptive orthodontics.
19. Oral Habits in Children:
- Definition, Etiology & Classification
 - Clinical features of digit sucking, tongue thrusting, mouth breathing & various other secondary habits.
 - Management of oral habits in children.
20. Dental care of children with special needs:
- Definition Etiology, Classification, Behavioural, Clinical features & Management of children with:
 - Physically handicapping conditions
 - Mentally compromising conditions.
 - Medically compromising conditions.
 - Genetic disorders.
21. Oral manifestations of Systemic disorders in Children & their Management.
22. Management of Minor Oral Surgical Procedures in Children.
23. Dental Radiology as related to Pediatric Dentistry.
24. Cariology.
- Historical background.
 - Definition, Aetiology & Pathogenesis.
 - Caries pattern in primary, young permanent and permanent teeth in children.
 - Rampant caries, early childhood caries and extensive caries. Definition, aetiology, Pathogenesis, Clinical features, Complications & Management.

- Role of diet and nutrition in Dental Caries.
 - Dietary modifications & Diet counseling.
 - Subjective & Objective methods of Caries detection with emphasis on Caries Activity tests, Caries prediction, Caries susceptibility & their clinical Applications.
25. Pediatric Oral Medicine & Clinical Pathology: Recognition & Management of Developmental dental anomalies, teething disorders, stomatological conditions, mucosal lesions, viral infection etc.
 26. Congenital Abnormalities in Children: Definition, Classification, Clinical features & Management.
 27. Dental Emergencies in Children and their Management.
 28. Dental Materials used in Pediatric Dentistry.
 29. Preventive Dentistry:
 - Definition.
 - Principles & Scope
 - Types of Prevention.
 - Different preventive measures used in Pediatric Dentistry including fissure sealants and caries vaccine.
 30. Dental Health Education & School Dental Health Programmes.
 31. Dental health concepts, Effects of civilization and environment, Dental Health delivery system, Public Health measures related to children along with principles of pediatric preventive Dentistry.
 32. Fluorides:
 - Historical background.
 - Systemic & Topical fluorides.
 - Mechanism of action.
 - Toxicity & Management.
 - Defluoridation techniques.
 33. Medicolegal aspects in Paediatric Dentistry with emphasis on informed consent.
 34. Counseling in Pediatric Dentistry.
 35. Case History Recording, Outline of principles of examination, diagnosis & treatment planning.
 36. Epidemiology: Concepts, Methods of recording & evaluation of various oral diseases. Various national & global trends of epidemiology of oral diseases.
 37. Comprehensive Infant Oral Health Care.
 38. Principles of Bio – Statistics & Research Methodology & Understanding of Computers and Photography.
 39. Comprehensive cleft care management with emphasis on counseling, feeding, nasoalveolar bone remodeling, speech rehabilitation.
 40. Setting up of Paedodontics & Preventive Dentistry Clinic.
 41. Emerging concepts of Dentistry of scope of laser / minimal intervention procedures: Pediatric Dentistry.

FIRST YEAR

Preclinical Work

(Duration – first 6 Months of First Year MDS)

1. Carving of all deciduous teeth
2. Basic wire bending exercises
3. Fabrication of
 - a. Maxillary bite plate / Hawley's
 - b. Maxillary expansion screw appliance
 - c. Canine retractor appliance
 - d. All habit breaking appliances
 - i. Removable type
 - ii. Fixed type
 - iii. Partially fixed and removable
 - e. Two Myofunctional appliances
 - f. Making of inclined plane appliance.
 - g. Feeding appliances
4. Basic soldering exercise I – making of a lamppost of stainless steel wire pieces of different gauges soldered on either side of heavy gauge main post.
5. Fabrication of space maintainers
 - a) Removable type-
 - Unilateral Non – Functional space maintainer
 - Bilateral Non - Functional space maintainer
 - Unilateral functional space maintainer
 - Bilateral functional space maintainer
 - b) Space Regainers-
 - Hawley's appliances with Helical space regainer
 - Removable appliance with Slingshot space regainer
 - Removable appliance with Dumbell space regainer
 - Gerber space regainer.
 - c) Fixed Space maintainers
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 - Band & short loop space maintainer
 - Mayne's space maintainer.
 - Transpalatal arch space maintainer.
 - Nance Palatal holding arch
 - Nance Palatal holding arch with canine stoppers.
 - Distal shoe appliance
6. Basics for spot welding exercise
7. Collection of extracted deciduous and permanent teeth
 - a) Sectioning of the teeth at various levels and planes
 - b) Drawing of section and shapes of pulp

- c) Phantom Head Exercises: Performing ideal cavity preparation for various restorative materials for both Deciduous and permanent teeth.
- d) Performing pulpotomy, root canal treatment and Apexification procedure
 - I. Tooth preparation and fabrication of various temporary and permanent restorations on fractured anterior teeth.
 - II. Preparation of teeth for various types of crowns
 - III. Laminates / Veneers
 - IV. Bonding & banding exercise
- 8. Performing of behavioral rating and IQ tests for children.
- 9. Computation of :-
 - a) Caries index and performing various caries activity tests.
 - b) Oral Hygiene Index
 - c) Periodontal Index
 - d) Fluorosis Index
- 10. Surgical Exercises :
 - a. Fabrication of splints
 - b. Types of Wiring
 - c. Suturing
- 11.
 - A. Taking of periapical, occlusal, bitewing radiographs of children
 - b. Developing and processing of films
 - c. Tracing of soft tissue dental and skeletal landmarks as observed on Cephalometric radiographs and drawing of various planes and angles, further interpretation of cephalometric radiographic analysis.
 - d. Mixed dentition cast analysis.
- 12. Library dissertation.
- 13. Synopsis.

Clinical Work Requirements from 7 to 36 Months

The following is the minimum requirement to be completed before the candidate can be considered eligible to appear in the final M.D.S Examinations:

NO.	Clinical Work	Total	7 To 12 Months	13 To 24 Months	25 To 36 Months
1.	Behavior Management of different age group children with complete records.	17	2	10	5
2.	Detailed Case evaluation with complete records, treatment planning and presentation of cases with chair side and discussion.	17	2	10	5
3.	Step – by – step chair side preventive dentistry scheduled for high risk children with gingival and periodontal diseases & Dental Caries.	11	1	5	5
4.	Practical application of Preventive	7	1	4	2

	dentistry concepts in a class of 35 – 50 children & Dental Health Education & Motivation.				
5.	Pediatric Operative Dentistry with application of recent concepts. (a) Management of Dental Caries				
	I. Class I	50	30	10	10
	II. Class II	100	40	50	10
	III. Other Restorations	100	20	50	30
	(b) Management of traumatized anterior teeth.	15	04	06	05
	(c) Aesthetic Restorations	25	05	10	10
	(d) Pediatric Endodontic Procedures - Deciduous teeth Pulpotomy/Pulpectomy - Permanent Molars - Permanent Incisor - Apexification & Apexogenesis	150 20 15 20	30 03 02 02	50 07 03 08	70 10 10 10
6.	Stainless Steel Crowns	50	10	20	20
7.	Other Crowns	05	01	02	02
8.	Fixed: Space Maintainers & Habit breaking appliances	30	08	12	10
9.	Removable : Space Maintainers & Habit breaking appliances	20	05	07	08
10	Functional Appliances	05	01	02	02
11.	Preventive measure like fluoride applications & Pit & Fissure Sealant applications with complete follow – up and diet counseling.	20	08	08	04
12	Special Assignments				
	i. School Dental health Programmes	03	01	01	01
	ii. Camps etc.,	02	01	01	-

14. Library usage

15. Laboratory usage

16. Continuing Dental Health Programme.

(The figures given against Sl.NO. 4 to 12 are the minimum number of recommended procedures to be performed).

MONITORING LEARNING PROGRESS:

It is essential to monitor the Learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

SCHEME OF EXAMINATION:

A. THEORY : 400 MARKS

Written examination shall consist of four question papers each of three hours duration. Total marks for each paper will be 100. Paper I, II and III shall consist of two long questions carrying 20 marks each and 6 short essay questions each carrying 10 marks. Paper IV will be on Essay. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows: *

Paper I: Applied Basic Sciences: Applied Anatomy, Physiology, Pathology, Microbiology, Nutrition & Dietetics, Growth & Development , Dental plaque, Genetics.

Paper II: Clinical Paedodontics.

- 1) Conscious sedation, Deep Sedation & General Anesthesia in Pediatric Dentistry.
- 2) Gingival & Periodontal Diseases in Children.
- 3) Pediatric Operative Dentistry.
- 4) Pediatric Endodontics.
- 5) Traumatic Injuries in Children.
- 6) Interceptive Orthodontics.
- 7) Oral Habits in children.
- 8) Dental Care of Children with special needs.
- 9) Oral Manifestations of Systemic Conditions in Children & their Management.
- 10) Management of Minor Oral Surgical Procedures in Children.
- 11) Dental Radiology as Related to Pediatric Dentistry.
- 12) Pediatric Oral Medicine & Clinical Pathology.
- 13) Congenital Abnormalities in Children.
- 14) Dental Emergencies in Children & their Management.
- 15) Dental Materials Used in Pediatric Dentistry.
- 16) Case History Recording.
- 17) Setting up of Paedodontics & Preventive Dentistry Clinic.

Paper III: Preventive and Community Dentistry as applied to Pediatric Dentistry.

1. Child Psychology.
2. Behavior Management.
3. Child Abuse & Dental Neglect.
4. Preventive Paedodontics.

5. Cariology.
6. Preventive Dentistry.
7. Dental Health Education & School Dental Health Programmes.
8. Fluorides.
9. Epidemiology.
10. Comprehensive Infant Oral Health Care / Comprehensive cleft care.
11. Principles of Bio – Statistics & Research Methodology & Understanding of Computers and Photography.

Paper IV: Essay

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is Inevitable. Students should be prepared to answer overlapping topics.

B. Practical Examination : 200 Marks

The Clinical/Practical and Viva – Voce Examination are conducted for a minimum of two days.

First Day:

1. Case Discussion, Pulp Therapy i.e. Pulpectomy on a Primary Molar.

Case Discussion	: 20 marks
Rubber Dam application	: 10 marks
Working length X – ray	: 20 marks
Obturation	: 20 marks

Total	70 marks

2. Case Discussion, Crown preparation on a Primary Molar for Stainless steel crown and cementation of the same.

Case discussion	: 10 marks
Crown Preparation	: 20 marks
Crown selection and Cementation	: 20 marks

Total	50 marks

3. Case Discussion, band adaptation for fixed type of space maintainer and impression making.

Case discussion	: 20 marks
Band adaptation	: 20 marks
Impression	: 20 marks

Total

60 marks

Second Day:

1. Evaluation of Fixed Space Maintainer and Cementation : 20 marks

C. Viva Voce : 100 Marks

I. Viva – Voce examination : 80 marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

II. Pedagogy Exercise: 20 marks

A topic will be given to each candidate in the beginning of clinical examination. He / She is asked to make a presentation on the topic for 8 – 10 minutes.

MD00PD002- PAEDODONTICS & PREVENTIVE DENTISTRY-I

OBJECTIVES:

At the end of 3 years of training, the candidate should be able to

1. Create good oral health in the child and also a good citizen tomorrow.
2. Instill a positive attitude and behavior in children towards Dental health.
3. Understand the principles of prevention and preventive dentistry right from birth to adolescence.
4. Guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry.
5. Prevent and intercept developing malocclusion.

SKILLS:

1. Obtain proper clinical history, methodological examination of child patient, perform essential diagnostic procedures, interpret them, and arrive at a reasonable diagnosis for appropriate treatment.
2. Be competent to treat dental diseases which are occurring in child patient.
3. Repair and restore the lost / tooth structure to maintain harmony between both hard and soft tissues of the oral cavity.
4. Manage the disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.
5. To acquire skills in managing efficiently life threatening conditions with emphasis on basic life support measures.

ATTITUDES:

1. Develop an attitude to adopt ethical principles in all aspects of Paedodontic practice.
2. Professional honesty and integrity are to be fostered.
3. Treatment care is to be delivered irrespective of the social status, cast, creed, and religion of the patients.
4. Willingness to share the knowledge and clinical experience with professional colleagues.
5. Willing to adopt, after a critical assessment, new methods and techniques of Paedodontic management developed from time to time, based on scientific research, which are in the best interest of the child patient.
6. Respect child patient's rights and privileges, including child patient's right to information and right to seek a second opinion.
7. Develop an attitude to seek opinion from allied medical and dental specialties, as and when required.

COURSE CONTENTS:

1. Applied Anatomy & genetics.
2. Applied Physiology.
3. Applied Pathology.
4. Nutrition and Dietetics.
5. Growth & Development: Prenatal and Postnatal development of cranium, face, jaws, teeth and supporting structures. Chronology of dental development and development of occlusion. Dimensional changes in dental arches. Cephalometric evaluation of growth.
6. Child Psychology: Development & Classification of behavior, personality, intelligence in children, theories of child psychology, stages of psychological child development, fear anxiety, apprehension & its management.
7. Behavior Management: Non – pharmacological & Pharmacological methods.
8. Child Abuse & Dental Neglect.
9. Conscious Sedation, Deep Sedation & General Anesthesia in Pediatric Dentistry: (Including Other Drugs, Synergic & Antagonistic Actions of Various Drugs used in Children.
10. Preventive Paedodontics: Concepts, chair side preventive measures for dental diseases, high – risk caries including rampant & extensive caries – Recognition, Features & Preventive Management, Pit and Fissures Sealants, Oral Hygiene measures, Correlation of brushing with dental caries and periodontal diseases. Diet & Nutrition as related to dental caries. Diet Counseling.
11. Dental Plaque: Definition, Initiation, Pathogenesis, Biochemistry, and Morphology & Metabolism.
12. Microbiology & Immunology as related to Oral Diseases in Children: Basic concepts, immune system in human body, Auto Immune diseases, Histopathology, Pathogenesis, Immunology of dental caries, Periodontal diseases, Tumors, Oral Mucosal lesions etc.
13. Gingival & Periodontal diseases in Children:
 - Normal Gingiva & Periodontium in children.
 - Gingival & Periodontal diseases – Etiology, Pathogenesis, Prevention & Management.
14. Pediatric Operative Dentistry
 - Principles of Operative Dentistry along with modifications of materials / past, current & latest including tooth colored materials.
 - Modifications required for cavity preparation in primary and young permanent teeth.
 - Various Isolation Techniques.
 - Restoration of decayed primary, young permanent and permanent teeth in children using various restorative materials like Glass Ionomer, Composites, Silver Amalgam & latest materials (gallium).
 - Stainless steel, Polycarbonate & Resin Crowns / Veneers & fibre post systems.
15. Pediatric Endodontics:
 - a. Primary Dentition: - Diagnosis of pulp diseases and their management – Pulp capping, Pulpotomy, pulpectomy (Materials & Methods), Controversies & recent concepts.
 - b. Young permanent teeth and permanent teeth, Pulp capping, Pulpotomy, Apexogenesis, Apexification, Concepts, Techniques and Materials used for different procedures.

- c. Recent advances in Pediatric diagnosis and Endodontics.
16. Prosthetic consideration in Pediatric Dentistry.
17. Traumatic Injuries in Children:
- Classification & Importance.
 - Sequelae & reaction of teeth to trauma.
 - Management of Traumatized teeth with latest concepts.
 - Management of jaw fracture in children.
18. Interceptive Orthodontics:
- a. Concepts of occlusion and esthetics: Structure and function of all anatomic components of occlusion, mechanics of articulations, recording of masticatory function, diagnosis of Occlusal dysfunction, relationship of TMJ anatomy and pathology and related neuromuscular physiology.
 - b. A comprehensive review of the local and systemic factors in the causation of malocclusion.
 - c. Recognition and management of normal and abnormal developmental occlusions in primary, mixed and permanent dentitions in children (Occlusal Guidance).
 - d. Biology of tooth movement: A comprehensive review of the principles of teeth movement. Review of contemporary literature. Histopathology of bone and periodontal ligament, Molecular and ultra cellular consideration in tooth movement.
 - e. Myofunctional appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - f. Removable appliances: Basic principles, contemporary appliances: Design & Fabrication.
 - g. Case selection & diagnosis in interceptive orthodontics.
 - h. Space Management: Etiology, Diagnosis of space problems, analysis, Biomechanics, Planned extraction in interceptive orthodontics.
19. Oral Habits in Children:
- Definition, Etiology & Classification
 - Clinical features of digit sucking, tongue thrusting, mouth breathing & various other secondary habits.
 - Management of oral habits in children.
20. Dental care of children with special needs:
- Definition Etiology, Classification, Behavioural, Clinical features & Management of children with:
 - Physically handicapping conditions
 - Mentally compromising conditions.
 - Medically compromising conditions.
 - Genetic disorders.
21. Oral manifestations of Systemic disorders in Children & their Management.
22. Management of Minor Oral Surgical Procedures in Children.
23. Dental Radiology as related to Pediatric Dentistry.
24. Cariology.
- Historical background.
 - Definition, Aetiology & Pathogenesis.
 - Caries pattern in primary, young permanent and permanent teeth in children.
 - Rampant caries, early childhood caries and extensive caries. Definition, aetiology, Pathogenesis, Clinical features, Complications & Management.

- Role of diet and nutrition in Dental Caries.
 - Dietary modifications & Diet counseling.
 - Subjective & Objective methods of Caries detection with emphasis on Caries Activity tests, Caries prediction, Caries susceptibility & their clinical Applications.
25. Pediatric Oral Medicine & Clinical Pathology: Recognition & Management of Developmental dental anomalies, teething disorders, stomatological conditions, mucosal lesions, viral infection etc.
 26. Congenital Abnormalities in Children: Definition, Classification, Clinical features & Management.
 27. Dental Emergencies in Children and their Management.
 28. Dental Materials used in Pediatric Dentistry.
 29. Preventive Dentistry:
 - Definition.
 - Principles & Scope
 - Types of Prevention.
 - Different preventive measures used in Pediatric Dentistry including fissure sealants and caries vaccine.
 30. Dental Health Education & School Dental Health Programmes.
 31. Dental health concepts, Effects of civilization and environment, Dental Health delivery system, Public Health measures related to children along with principles of pediatric preventive Dentistry.
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FIRST YEAR

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(Duration – first 6 Months of First Year MDS)

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Clinical Work Requirements from 7 to 36 Months

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12	Special Assignments				
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A. THEORY : 400 MARKS

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2. Behavior Management.
3. Child Abuse & Dental Neglect.
4. Preventive Paedodontics.

5. Cariology.
6. Preventive Dentistry.
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11. Principles of Bio – Statistics & Research Methodology & Understanding of Computers and Photography.

Paper IV: Essay

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is Inevitable. Students should be prepared to answer overlapping topics.

B. Practical Examination : 200 Marks

The Clinical/Practical and Viva – Voce Examination are conducted for a minimum of two days.

First Day:

1. Case Discussion, Pulp Therapy i.e. Pulpectomy on a Primary Molar.

Case Discussion	: 20 marks
Rubber Dam application	: 10 marks
Working length X – ray	: 20 marks
Obturation	: 20 marks

Total	70 marks

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Crown selection and Cementation	: 20 marks

Total	50 marks

3. Case Discussion, band adaptation for fixed type of space maintainer and impression making.

Case discussion	: 20 marks
Band adaptation	: 20 marks
Impression	: 20 marks

Total

60 marks

Second Day:

1. Evaluation of Fixed Space Maintainer and Cementation : 20 marks

C. Viva Voce : 100 Marks

I. Viva – Voce examination : 80 marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also.

II. Pedagogy Exercise: 20 marks

A topic will be given to each candidate in the beginning of clinical examination. He / She is asked to make a presentation on the topic for 8 – 10 minutes.



Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as deemed to be university under section 3 of UGC Act 1956, vide notification No.F.9-52000-U.3)

BACHELOR OF DENTAL SURGERY

REGULATIONS AND SYLLABUS 2017

BRANCH – IX

ORAL MEDICINE AND RADIOLOGY

OBJECTIVES:

At the end of 3 years of training the candidate should be able to acquire adequate knowledge of the discipline.

KNOWLEDGE:

Theoretical, Clinical and practical knowledge of all oral mucosal lesions, skeletal involvement in maxillofacial region, diagnostic procedures pertaining to them and latest information of imaging modalities.

SKILLS AND ATTITUDE:

Three important skills need to be imparted and maxillo – facial diseases

1. Diagnostic skill in recognition of oral with radiographic diagnosis and their management
2. Research skills in handling scientific problems pertaining to oral treatment
3. Clinical and Didactic skills in encouraging younger doctors to attain learning objectives

ATTITUDES:

The positive mental attitude and the persistence of continued learning need to be inculcated

COURSE CONTENTS:

PAPER I: Applied Basic Sciences

Applied Anatomy

1. Gross anatomy of the face:
 - a. Muscles of Facial Expression And Muscles Of Mastication
 - b. Facial nerve
 - c. Facial artery
 - d. Facial vein
 - e. Parotid gland and its relations
2. Neck region:
 - a. Triangles of the neck with special reference to Carotid, Digastric triangles and midline structures
 - b. Facial spaces

- c. Carotid system of arteries, Vertebral Artery, and Subclavian arteries
 - d. Jugular system
 - Internal jugular
 - External jugular
 - e. Lymphatic drainage
 - f. Cervical plane
 - g. Muscles derived from Pharyngeal arches
 - h. Infratemporal fossa in detail and temporomandibular joint
 - i. Endocrine glands
 - Pituitary
 - j. Sympathetic chain
 - k. Cranial nerves – V, VII, IX, XI, & XII
 - Thyroid
 - Parathyroid
 - l. Exocrine glands
 - Parotid
 - Thyroid
 - Parathyroid
3. Oral Cavity:
 - a. Vestibule and oral cavity proper
 - b. Tongue and teeth
 - c. Palate – soft and hard
 4. Nasal Cavity:
 - a. Nasal septum
 - b. Lateral wall of nasal cavity
 - c. Paranasal air sinuses
 5. Pharynx:

Gross salient features of brain and spinal cord with references to attachment of cranial nerves to the brainstem

Detailed study of the cranial nerve nuclei of V, VII, IX, X, XI, XII.

Osteolgy: Comparative study of fetal and adult skull

Mandible: Development, ossification, age changes and evaluation of mandible in detail.

EMBRYOLOGY:

1. Development of face, palate, nasal septum and nasal cavity, paranasal air sinuses
2. Pharyngeal apparatus in detail including the floor of the primitive pharynx
3. Development of tooth in detail and the age changes
4. Development of salivary glands

5. Congenital anomalies of face must be dealt in detail.

HISTOLOGY:

1. Study of epithelium of oral cavity and the respiratory tract
2. Connective tissue
3. Muscular tissue
4. Nervous tissue
5. Blood vessels
6. Cartilage
7. Bone and tooth
8. Tongue
9. Salivary glands
10. Tonsil, thymus, lymph nodes

PHYSIOLOGY:

1. General Physiology:
 - Cell
 - Body Fluid Compartments
 - Classification
 - Composition
 - Cellular transport
 - RMP and action potential

MUSCLE NERVE PHYSIOLOGY:

1. Structure of a neuron and properties of nerve fibers
2. Structure of muscle fibers and properties of muscle fibers
3. Neuromuscular transmission
4. Mechanism of muscle contraction

BLOOD:

1. RBC and Hb
2. WBC – Structure and functions
3. Platelets – functions and applied aspects
4. Plasma proteins
5. Blood Coagulation with applied aspects
6. Blood groups
7. Lymph and applied aspects

RESPIRATORY SYSTEM:

- Air passages, composition of air, dead space, mechanics of respiration with pressure and volume changes
- Lung volumes and capacities and applied aspects
- Oxygen and carbon dioxide transport
- Neural regulation of respiration
- Chemical regulation of respiration
- Hypoxia, effects of increased barometric pressure and decreased barometric pressure

CARDIO – VASCULAR SYSTEM:

- Cardiac Cycle
- Regulation of heart rate/Stroke volume/cardiac output/ blood flow
- Regulation of blood pressure
- Shock, hypertension, cardiac failure

EXCRETORY SYSTEM:

- Renal function tests

Gastro – intestinal tract:

Composition, functions and regulation of:

- Saliva
- Gastric juice
- Pancreatic juice
- Bile and intestinal juice
- Mastication and deglutition

ENDOCRINE SYSTEM:

- Hormones – classification and mechanism of action
- Hypothalamic and pituitary hormones
- Thyroid hormones
- Parathyroid hormones and calcium homeostasis
- Pancreatic hormones
- Adrenal hormones

CENTRAL NERVOUS SYSTEM:

- Ascending tract with special references to pain pathway

SPECIAL SENSES:

- Gustation and Olfaction

BIOCHEMISTRY:

1. Carbohydrates:

- Disaccharides specifically maltose, lactose, sucrose
- Digestion of starch / absorption of glucose
- Metabolism of glucose, specifically glycolysis, TCA cycle, gluconeogenesis
- Blood sugar regulation
- Glycogen storage regulation
- Glycogen storage diseases
- Galactosemia and fructosemia

2. Lipids:

- Fatty acids – Essential / non essential
- Metabolism of fatty acids – oxidation, ketone body formation, utilization ketosis
- Outline of cholesterol metabolism – synthesis and formed from cholesterol

3. Protein:

- Amino acids – essential / non essential, complete / incomplete proteins
- Transamination / Deamination (Definition with examples)
- Urea cycle
- Tyrosine – Hormones synthesized from tyrosine
- In born errors of amino acid metabolism
- Methionine and transmethylation

4. Nucleic Acids:

- Purines / Pyrimidines
- Purine analogs in medicine
- DNA/RNA – Outline of structure
- Transcription/translation
- Steps of protein synthesis
- Inhibitions of protein synthesis
- Regulation of gene functions

5. Minerals:

- Calcium/Phosphorous metabolism specifically regulation of serum calcium levels
- Iron metabolism
- Iodine metabolism
- Trace elements in nutrition

6. Energy Metabolism:

- Basal metabolic rate
- Specific dynamic action (SDA) of foods

7. Vitamins:

- Mainly these vitamins and their metabolic role – specifically vitamin A, vitamin C, vitamin D, Thiamin, Riboflavin, Niacin, Pyridoxine.

PATHOLOGY:

1. Inflammation:

- o Repair and regeneration, necrosis and gangrene
- o Role of complement system in acute inflammation
- o Role of arachidonic acid and its metabolites in acute inflammation
- o Growth factors in acute inflammation
- o Role of molecular events in cell growth and intercellular signaling cell surface receptors
- o Role of NSAIDS in inflammation
- o Cellular changes in radiation injury and its manifestations

2. Homeostasis:

- o Role of Endothelium in thrombo – genesis
- o Arterial and venous thrombi
- o Disseminated Intravascular Coagulation

3. Shock:

- o Pathogenesis of hemorrhagic, neurogenic, septic, cardiogenic shock, circulatory disturbances, ischemic hyperemia, venous congestion, edema, infarction.

4. Chromosomal Abnormalities:

- o Marfan's syndrome
- o Ehler's Danlos Syndrome
- o Fragile X syndrome

5. Hypersensitivity:

- o Anaphylaxis
- o Type II Hypersensitivity
- o Type III Hypersensitivity
- o Cell mediated Reaction and its clinical importance
- o Systemic Lupus Erythmatosus
- o Infection and infective granulomas

6. Neoplasia:

- o Classification of Tumors
- o Carcinogenesis & Cacinogens – Chemical, Viral and Microbial

- o Grading and Staging of Cancer, Tumor Angiogenesis, Paraneoplastic Syndrome
 - o Spread of tumors
 - o Characteristics of benign and malignant tumors
7. Others:
- o Sex linked agamaglobulinemia
 - o AIDS
 - o Management of Immune deficiency patients requiring surgical procedures
 - o De George's Syndromes
 - o Ghons complex, post primary pulmonary tuberculosis – pathology and pathogenesis.

PHARMACOLOGY:

1. Definition of terminologies used.
2. Dosage and mode of administration of drugs.
3. Action and fate of drugs in the body.
4. Drugs acting on the CNS.
5. Drug addiction, tolerance and hypersensitive reactions.
6. General and local anesthetics, hypnotics, antiepileptics, and tranquilizers.
7. Chemotherapeutics and antibiotics.
8. Analgesics and anti – pyretics.
9. Anti – tubercular and anti – syphilitic drugs
10. Antiseptics, sialogogues, and anti – sialogogues.
11. Haematinics.
12. Anti – diabetics.
13. Vitamins – AB Complex, C, D, E, K.
14. Steroids.

PAPER – II ORAL AND MAXILLOFACIAL RADIOLOGY

Study includes Seminars / lectures / Demonstrations

1. History of radiology, structure of X – ray tube, production of X – ray, property of X – rays.
2. Biological effects of radiation.
3. Filtration of collimation, grids and units of radiation.
4. Films and recording media
5. Processing of image in radiology.
6. Design of X – ray department, dark room and use of automatic processing units.
7. Localization by radiographic techniques.

8. Faults of dental radiographs and concept of ideal radiograph
9. Quality assurance and audit in dental radiology.
10. Extra – oral – imaging techniques.
11. OPG and other radiologic techniques
12. Advanced imaging technique like CT Scan, MRI, Ultrasound & thermo graphiy.
13. Radio nucleotide techniques.
14. Contrast radiography in salivary gland, TMJ, and other radiolucent pathologies.
15. Radiation protection and ICRP guidelines.
16. Art of radiographic report, writing and descriptors preferred in reports.
17. Radiograph differential diagnosis of radiolucent, radio opaque and mixed lesions.
18. Digital radiology and its various types of advantages.

PAPER – III: ORAL MEDICINE, THERAPEUTICS AND LABORATORY INVESTIGATIONS

1. Study includes seminars / lectures / discussion.
2. Methods of clinical diagnosis of oral and systemic diseases as applicable to oral tissue including modern diagnostic techniques
3. Laboratory investigations including special investigations of oral and oro – facial diseases.
4. Teeth in local and systemic diseases, congenital, and hereditary disorders.
5. Oral manifestations of systemic diseases.
6. Oro – facial pain.
7. Psychosomatic aspects of oral diseases.
8. Management of medically compromised patients including medical emergencies in the dental chair.
9. Congenital and Hereditary disorders involving tissues of oro facial region.
10. Systemic diseases due to oral foci of infection.
11. Hematological, Dermatological, Metabolic, Nutritional, Endocrinal conditions with oral manifestations.
12. Neuromuscular diseases affecting oro – facial region.
13. Salivary gland disorders.
14. Tongue in oral and systemic diseases.
15. TMJ dysfunction and diseases.
16. Concept of immunity as related to oro – facial lesions, including AIDS.
17. Cysts, Neoplasms, Odontomes, and fibro – osseous lesions.
18. Oral changes in Osteo – dystrophies and chondro – dystrophies.
19. Pre malignant and malignant lesions of oro facial region.

20. Allergy and other miscellaneous conditions.
21. Therapeutics in oral medicine – clinical pharmacology.
22. Forensic odontology.
23. Computers in oral care in treatment planning.
24. Evidence based oral care in treatment planning.
25. Molecular Biology.

ESSENTIAL KNOWLEDGE:

Basic medical subjects, Oral Medicine, Clinical Dentistry, Management of Medical Emergencies, Oral Radiology, Techniques and Inter – Operation, Diagnosis of Oro – facial Disorders.

PROCEDURAL AND OPERATIVE SKILLS:

1ST Year:

1. Examination of Patient
 - Case history recordings - 100
 - FNAC - 50
 - Biopsy - 50
 - Observe, Assist, & perform under supervision.
2. Intra – oral radiographs:
 - Perform an interpretation - 500

2nd YEAR:

1. Dental treatment to medically compromised patients
 - Observe, assist, and perform under supervision.
2. Extra – oral radiographs, digital radiography – 20
 - Observe, assist and perform under supervision.

OPERATIVE SKILLS:

1. Giving intra – muscular and intravenous injections.
2. Administration of oxygen and life saving drugs to the patients.
3. Performing basic CPR and certification by Red Cross.

3rd YEAR

All the above

- Performed independently – Case history: Routine cases – 100.

- Interesting Cases - 25.
- Intra – Oral Radiographs - 100.
- Periapical view- 100.
- Bitewing view - 50.
- Occlusal view - 50.
- Extra – oral radiographs of different views - 100.

MONITORING LEARNING PROGRESS:

It is essential to monitor the Learning progress to each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring to be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Section IV.

SCHEME OF EXAMINATION:

A. THEORY : 400 MARKS

Written examination shall consist of four question paper each of three hours duration. Total marks for each paper will be 100. Paper I, II and III shall consist of two long question carrying 20 marks each and 6 short essay question each carrying 10marks. Paper IV will be on Essay. Question on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows: *

Paper I: Applied Basic Sciences: Applied Anatomy, Physiology, Biochemistry, pathology, and Pharmacology.

Paper II: Oral and Maxillofacial Radiology.

Paper III: Oral Medicine, therapeutics and laboratory investigations.

Paper IV: Essay

*The topics assigned to the different papers are generally evaluated under those sections. However a strict division of the subject may not be possible and some overlapping of topics is

Inevitable Students. Should be prepared to answer overlapping topics.

B. PRACTICAL AND CLINICAL EXAMINATION : 200 Marks
Day 1

Clinical Case Presentation

2 Spotters	2 X 10 = 20 Marks
2 Short Cases	2 X 15 = 30 Marks
1 Long Case	<u>1 X 50 = 50 Marks</u>
	<u>Total = 100 Marks</u>

Radiology Exercise

I. A) One Intra Oral Radiography : 10 Marks

B) One Occlusal Radiograph : 30 Marks

II. A) Two Extra Oral Radiograph : 2 X 30 = 60 Marks

Including technique and interpretation

2nd Day

C. Viva Voce : 100 Marks

I. Viva – Voce examination : 80 marks

All examiners will conduct viva – voce conjointly on candidate's comprehension, analytical approach, expression, interpretation of data and communication skills. It includes all components of course contents. It includes presentation and discussion on dissertation also

II. Pedagogy Exercise: 20 marks

A topic be given to each candidate in the beginning of clinical examination. He / She is asked to make a presentation on the topic for 8 – 10 minutes.

BRANCH - IX

ORAL MEDICINE

AND RADIOLOGY

Evidence Based Oral Medicine

Objective: Any therapy that is administered to the patients to treat any disease should be based on evidence gathered from various research activities. Towards this the students will be trained to gather evidence from various literature sources.

Background: Oral Medicine is the speciality area of dentistry that deals with the diagnosis and management of oral diseases. Oral medicine deals with diagnosis and treatment of soft-tissue & hard tissue lesions. The diagnosis and treatment of oral lesions is often based on empirical decision-making and many approaches to treatment have not been well-supported by clinicopathologic studies. The need for evidence-based, scientifically documented approaches to both diagnosis and treatment is eminent. Specific diagnostic criteria are lacking for many oral diseases, and therapeutic strategies have not been assessed by the gold standard of placebo-controlled, double-blind trials. Evidence-based dentistry (EBD) is a new paradigm in medicine, meaning that a therapy should be based on evidence gathered from scientific studies, preferentially based on randomized clinical trials involving a substantial number of patients.

The American Dental Association (ADA) defines the term “EBD” as follows: EBD is an approach to oral health care needs of the patients that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient’s oral and medical condition and history, with the dentist’s clinical expertise.

The use of EBD may help in decreasing the variations of patient care and outcomes that appears to be related with four factors: 1. The value of science underlying clinical care 2. The quality in making clinical decisions 3. The deviations of the level of clinical skill 4. The large and increasing volume of literature.

Skills: The students will be trained to develop the following skills.

Ask, Acquire, Appraise, Apply and Assess

1. Ask a question.
2. Search the latest research.
3. Incorporate clinical experience.
4. Accommodate patient preferences.

5. Apply the results.

Towards the set goal the students will be trained to treat any disease based on the following levels of evidence.

Levels	Type of Evidence
I	Randomised Control Trials
II	Cohort Studies
III	Case Control Studies
IV	Case Series

Grading of Recommendations

Grade	Descriptor	Qualifying Evidence	Implications for Practice
A	Strong recommendation	Level I evidence or consistent findings from multiple studies of levels II, III, or IV	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present
B	Recommendation	Levels II, III, or IV evidence and findings are generally consistent	Generally, clinicians should follow a recommendation but should remain alert to new information and sensitive to patient preferences
C	Option	Levels II, III, or IV evidence, but findings are inconsistent	Clinicians should be flexible in their decision-making regarding appropriate practice, although they may set bounds on alternatives; patient preference should have a substantial influencing role
D	Option	Level V evidence: little or no	Clinicians should consider all options in their decision making and be alert to new published evidence that clarifies the balance of benefit versus harm;

Grade	Descriptor	Qualifying Evidence	Implications for Practice
		systematic empirical evidence	patient preference should have a substantial influencing role