

PROGRAM MD PATHOLOGY

(Revised with effect from 2019-2020 onwards)

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
- f) Medical statistics

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
7. Francis C.M Medical Ethics, J.P.Publication, Bangalore 1993
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, 1sted. Oxford Blackwell Scientific Publications 1988
- 11.Mahajan B.K.Methods in Biostatistics for medical students,5thed 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

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 (U15MDPA01)

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(U15MDPA02)

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 (U15MDPA03)

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 (U15MDPA04)

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 (U15MDPA05) - 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