B.SC. RADIOLOGY AND IMAGING SCIENCE TECHNOLOGY

R 2017

CURRICULUM

UAH17CT101	**ANATOMY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Anatomy
OBJECTIVES	An outline of anatomy with special emphasis on applied aspects is provided to the students for better understanding of the technical and diagnostic procedure.

UNIT I: Organization of the human body

1. Introduction

- Introduction to human body
- Definition and subdivision of anatomy
- Anatomical position and terminology
- Region and systems of the body
- Cavities of the body and their contents
- Levels of organization of the body

2. Cell and genetics

- Parts of cell – cell membrane, cytoplasm, organelles, inclusion bodies, nucleus
- Structure of chromosome, DNA, RNA.
- Basics & fundamentals of Genetics, Karyotyping, Chromosomal disorders, prenatal diagnosis, geneticcounseling and gene therapy.
- Cell division – Definition and main events that occur in different stages of mitosis and meiosis.
- Tissues – Definition, characteristic features and types with example.
- Types of glands with example

UNIT II: Systems of support and movement

I. Skeletal system

- Cartilage: Type and basic histological feature.
- Bones: definition, classification based on location, name and number of bones with general

features ofimportant bones, function of bone, histological feature of a compact bone.

- Joints – Definition and types with example, Axis and movements. Shoulder, elbow, hip, knee joints –type, bones and ligaments involved, possible movements.

II. Muscular system

- Types of muscle with basic histological features
- Parts of skeletal muscle.
- Definition of origin and insertion
- Origin, insertion, nerve supply, action of sternocleidomastoid, pectoralis major, deltoid, gluteusmaximus and diaphragm.

UNIT III: Controls systems of the body

1. Nervous system

- Subdivisions of the nervous system
- Spinal cord-location, extent, external features and blood supply
- Brain-subdivision, location, external features of Medulla oblongata, Pons, Midbrain, Cerebellum, andCerebrum, Thalamus and Hypothalamus, Location and subdivision of ventricles of brain. Circle of Willis.
- Cranial nerves-name, number, attachment, area of distribution
- Spinal nerves-typical spinal nerves. Name and location of plexuses. Location and distribution of brachialand lumbosacral plexus.
- Autonomic nervous system-sympathetic and parasympathetic nervous system. Location of preganglionicand postganglionic neurons.

2. Sense organs

- Location and features of nose, tongue, eye, ear and skin.

3. Endocrine system

- Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal,pancreas, ovaries and testes. Names of hormones produced by each gland.
- Microscopic features of thyroid and pancreas.

UNIT IV: Maintenance of the human body

1. **Cardiovascular system**

- Types and general features of blood vessels. Structure and types of arteries and veins. Shape, size, location, covering, external and internal features of Heart. Conducting system of heart. Blood supply ofthe heart. Name, location, branches and main distribution of principal arteries and veins

2. Lymphatic system

- General features of Lymph nodes and lymphatic vessels. Name, location, external features, microscopicfeatures of tonsil and spleen.

3. Respiratory system

Name the organs of respiration. Location and features of Nasal cavity, pharynx, larynx, trachea, lung & pleura.Mention the microscopic feature of the lung.

4. Digestive system

- Name the parts of the alimentary canal and accessory organs. Location & features of esophagus, stomach, small and large intestine. Location and feature of tongue, salivary glands, pancreas, liver andgallbladder. Microscopic features of the liver.

5. Urinary system

- Names of urinary organs. Location and features of kidney, ureter, urinary bladder & urethra.Microscopic features of the kidney.

6. Reproductive system

- Names of male and female organs of reproduction. Location and features of testis, epididymis, vasdeferens, prostate gland and spermatic cord. Location & features of uterus, uterine tube, ovary andbreast.

7. Embryology

- Structure of gametes & gametogenesis. Fertilization to development of embryo till 3rd week.Derivatives of germ layers. Teratogens, Structure and Functions of placenta.

UNIT V: Anatomical regions

- Simple ideas about scalp, triangles of neck, axilla, cubital fossa, carpal tunnel, mediastinum, umbilicus, inguinal canal, femoral triangle
- sub sartorial canal popliteal fossa

PRACTICALS/DEMONSTRATIONS

1. Demonstrations of dissected specimens.

2. Viewing of projection of microscopic slides of muscle, bone, cartilage, spleen, tonsil, lung, liver, kidney, thyroid and pancreas

REFERENCE BOOKS

1. Manipal manual for AHS by Dr. Sampath Madhyastha, (Second Edition) Published by CBS Publishers.

2. Handbook of anatomy for nurses by Dr. P. Saraswathi

3. Ross and Wilson, Anatomy and physiology in health & illness

COURSE OUTCOMES	
CO1	The student will be able to gain knowledge of general anatomy and locomotion.
CO2	The student will be able to gain knowledge of basic human anatomy and histology of CVS and Respiratory systems.
CO3	The student will be able to gain knowledge of basic human anatomy and histology of CNS, GI, excretotry and reproductive systems.
CO4	The student will be able to gain of knowledge basic human anatomy and histology of endocrine system and special senses.

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S					
2		**M**				
3			**S**			
4	s			**S**		**M**

Category	Basic Science (Non Clinical)
Approval	46th Meeting of Academic Council held in Aug, 2017

UAH17CT102	**PHYSIOLOGY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Physiology
OBJECTIVES	To know the basic functioning of the human body, and the various organ systems.

Unit-I

1. General Physiology:

- Concept of Homeostasis
- Cell structure and functions
- Transport across membranes

Body and body fluids:

- Body fluid volumes, compartments and composition
- Blood composition and functions
- Plasma proteins – Types and functions
- Erythrocytes – functions, Erythropoiesis, anemia‟s
- Leucocytes – classification and functions
- Platelets – morphology and functions
- Blood coagulation – Mechanism and name of anticoagulants
- Blood groups – Basis of ABO & Rh grouping, Erythroblastosis Foetalis

2. Muscle physiology:

- Muscles – Classification & structure of striated, nonstriated & cardiac muscle
- Neuromuscular junction
- Mechanism of skeletal muscle contraction

3. Digestive system:

- Salivary glands, functions of saliva
- Parts of stomach, composition & functions of gastric juice

- Pancreatic Juice – composition & functions
- Bile – composition & functions of bile & bile salts
- Functions of Small intestine & large intestine

Unit-II

1. Skin : Structure & Functions

2. Excretory system:

- Kidney: Basic physiological anatomy (Including JGA)
- Formation of urine – GFR
- Formation of urine – Reabsorption & secretion
- Micturition Reflex
- Dialysis – Principle, types
- Renal function tests

Unit-III

1. Endocrine system:

- Hypothalamo hypophyseal inter relationship
- Posterior pituitary hormones and its actions
- Anterior pituitary hormones, Growth hormone – Actions
- Dwarfism, gigantism, acromegaly
- Thyroid hormones – Actions
- Cretinism, Myxoedema, Grave‟s disease (clinical features)
- Parathyroid hormones – Functions, Tetany
- Insulin, Glucagon‟s – Actions, Diabetes mellitus
- Adrenal medullary hormones & their actions
- Adrenal cortex hormones & their actions

2. Reproductive system:

- Male reproductive organs – Spermatogenesis, Testosterone actions
- Female reproductive organs – menstrual cycle (endometrial and ovarian cycles) and its hormonal control
- Contraceptive methods in male and female

Unit-IV

1. Respiratory system:

- Basic physiological anatomy

- Surfactant
- Mechanics of respiration
- Lung volumes and capacities
- Oxygen transport, Carbon-di-oxide transport
- Nervous and chemical regulation
- Pulmonary function tests.

2. Cardiovascular system:

- Basic physiological anatomy, innervations of heart
- ECG – normal waves, intervals and their significance
- Cardiac cycle – mechanical events, Heart sounds
- Blood pressure – Definition, measurement, normal values, factors maintaining BP Regulation

Unit-V

1. Nervous system:

- Structure of neuron, neuroglial cells, synapse and transmission across it
- Reflex – Components of reflex arc, examples.
- Functions of ascending tracts – anterior, lateral spinothalamic tracts, Dorsal column
- Functions of Corticospinal (Pyramidal) tract-Descending tract
- Functional areas of cerebral cortex
- Functions of basal ganglia, thalamus, hypothalamus, limbic system and cerebellum

2. Special senses:

● Receptors for various special senses

Practical Demonstration

Hematology:

1. Enumeration of RBC count.
2. Enumeration of WBC count.
3. Differential Count.
4. Estimation of Hemoglobin.
5. Determination of blood group.
6. Determination of bleeding time and clotting time.

Clinical physiology:

1. Measurement of blood pressure.
2. Determination of Radial pulse

Reference Book

1. Human Physiology for BDS by A.K.Jain, 4th Edition, Avichal publishing co

COURSE OUTCOMES	
CO1	The student will be able to gain knowledge of general physiology, nerve-muscle physiologyand haematology.
CO2	The student will be able to gain knowledge of basic human physiology with respect to CVS,Respiratory system and GI system.
CO3	The student will be able to gain knowledge of basic human physiology of excretion andCNS.
CO4	The student will be able to gain knowledge of basic human physiology of special senses andendocrine system

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3			**S**			
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UAH17CT103	**BIOCHEMISTRY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Biochemistry
OBJECTIVES	To know the basic Biochemical reactions within the human body, and the various organ system.

UNIT I – Cell and its molecules

Cell – Cell organelles, Fluid Mosaic Model, functions of cell membrane, Brief description of transport across the cell membrane.

Carbohydrates – Definition, Classification with examples, Sources, physiological significance and HbA1c.

Lipids – Definition, Classification with examples, Sources, Types of lipids present in the body, storage form, storage site, free cholesterol structure, functions of lipids, lipoprotein structure and its functions.

Nucleic acids – Nucleotide, Nucleoside, types of nucleic acids, secondary structure of DNA & Its functions; Types of RNA & its functions.

UNIT II – Proteins and Enzymes

Proteins – Definition, Classification, functions of proteins, Plasma proteins; Classification of Amino acids with examples Hemoglobin structure, Functions of hemoglobin, hemoglobin derivatives, abnormal hemoglobin

Enzymes: Definition, Classification, coenzymes, Metalloenzymes, Factors affecting enzyme activity, Regulation of enzymes, overview of Mechanism of enzyme action, Isoenzymes and Clinical importance of enzymes

UNIT III-Vitamins, Minerals, Nutrition

Vitamins: Definition, Classification of Vitamins

Sources, RDA, Function & Deficiency symptoms of

- Fat Soluble Vitamins (A, D, E & K);
- Water Soluble Vitamins (Thiamine, Riboflavin, Niacin, Biotin, Pantothenic acid, Pyridoxine, Folic acid, Cobalamin) and Vitamin C

Minerals: Definition, Classification of Minerals Sources, RDA, Function, Reference levels & Deficiency Symptoms

- Calcium, Phosphorus, Iron Copper, Zinc, Sodium, Chloride, Iodine, Potassium, Fluorine and Selenium.

Nutrition: BMR, SDA, Dietary fibres, protein Energy Malnutrition and Obesity 24

UNIT IV – Bioenergetics and Metabolism

Bioenergetics: Electron Transport chain and Oxidative Phosphorylation

Metabolism

Carbohydrates: Digestion and absorption, Glycolysis, TCA cycle, Metabolism of Fructose and Galactose.

Lipids: Digestion and absorption, Beta oxidation of fatty acids, Regulation of Cholesterol level in the cell and outline of lipid transport.

Proteins: Digestion and Absorption, Formation and Disposal of Ammonia, Urea Cycle, Special Products of Glycine, Tyrosine and Tryptophan.

UNIT V – Miscellaneous

Outlines of DNA organization, Replication, Transcription, Genetic code and Translation

Organ function Tests: Liver, Renal and Bone.

PRACTICAL

- Spotters

COURSE OUTCOMES	
CO1	The student will be able to gain knowledge of biochemistry of cell structure, functions,digestion, enzymes and proteins.
CO2	The student will be able to gain knowledge of biochemistry of carbohydrates, minerals and vitamins
CO3	The student will be able to gain knowledge of liver and renal function tests, specialized laboratory investigations and lipids.
CO4	The student will be able to gain knowledge of biochemistry of metabolism, homeostasis,nucleic acids and cancer

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
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1	S				s	
2		**M**		s		
3	M		**S**			
4	s			**S**		**M**
Category	Basic Science (Non Clinical)					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CT104	**BASICS IN MEDICAL PHYSICS AND ELECTRONICS**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Radiology
OBJECTIVES	To know the basics in Medical Physics, Bio electric potential and the functioning of Medical equipment

Unit I: Laser

Nature of light-Reflection-Refraction-Total internal reflection-Optical fibers-Applications in Medicine – Laser-Principles-Action-Types of laser, Basic principles of laser in Medical Application – Argon-Ion laser photocoagulator-Photo thermal-Photochemical application-Applications of laser in Medicine-Laser hazards and safety measures.

Unit II: Radiation Physics

Introduction to nuclear physics and radioactivity, Radioactive radiations – X-ray, production of x-ray, Properties of x-ray radiations – Biological effects of radiation, Radiation damage in matter, Radiation protection principles, radiation detection and measurement – Ultrasound and generation of ultrasound.

Unit III: Introduction to Imaging Technique

Principles of Microscope: Simple microscope and compound microscope-Radiography: Making and X-ray image-Fluoroscopy. CT Scans, MRI – Ultrasonography: Ultrasound picture of Body-A-Scan-M-Scan-Ultrasound diathermy-Phonocardiography – Radio isotopes: Uses of Radio isotopes – 99mTc Generator – Scintillation detectors – Application of scintillation detectors – Gamma Camera – Positron Camera

Unit IV: Semiconductor devices

Principles of diodes and Transistors – Integrated circuits – Amplifiers – Basic configuration and types – differential and operational amplifiers – Waveform generators – Timer – A/D and D/A converters – Active filters – Transducers – Basic configuration and types.

Unit V: Bio potential Recording Systems

Introduction to bioelectric potential – Electrodes and surfaces – Bio potential amplifier – Frequency ranges of various biopotential signals – Working principles of bio potential recording systems – Electrocardiography – Electroencephalograph –Electromyography.

Reference Books:

1. New Understanding physics for advanced level – Jim Breithauput.

2. Advanced Physics for you by Keith Johnson, Simmons Hewett, Sue holt, John miller

3. Christensen‟s Physics of diagnostic Radiology by Thomas S. Curry III, M.D., Robert C Murry, Jr. PhD, Dow Dey, PhD.

4. Applied Electronics, A. Subramanyam, The National Publishing co., Madras (1996).

5. Design and Development of Medical Electronic Instrumentation, David Prutchi and Michael Norris, John Wiley & Sons (2005).

COURSE OUTCOMES	
CO1	The student will be able to know the functioning of radiological devices
CO2	The student will be able to understand the mechanism of functioning of medical equipments
CO3	The student will be able to know the functioning of Lab instruments
CO4	The student will be able to understand the functioning of radiation devices

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**
Category	Basic Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CT105	**ENGLISH**
	Total Contact Periods – 60
	Total credits -4
	Course Designed by – Department of English
OBJECTIVES	To enable students to enhance their ability to comprehend spoken and written English required for effective communication in their professional work. Students will practice their skills in verbal and written.

Unit I: Spoken Communication

Learning to read the phonetic symbols

Stress

Intonation

Rhythm

Commonly mispronounced words

Correct pronunciation of important commonly used

Words in hospital practice

Unit II: Vocabulary and Reading

Special features of English vocabulary

Common errors in choice of word

Semi technical vocabulary

Collecting material from library on scientific topics

Comprehensive exercises

Unit III: Writing

Writing letters regarding permission, leave, opening bank account etc.

Taking notes from lecture / reading materials

Writing reports on patient care

Summarizing scientific passages

Unit IV: Grammatical and Idiomatic Usage

Correction of errors

Types of interrogative sentences

Active-Passive voice

Tense

Principles of procession, clarity and specificity

Reference Books:

1. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill PublishingCompany Limited, New Delhi. (Approx. Cost Rs. 200)

2. English for colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers (Approx. cost Rs. 150)

COURSE OUTCOMES	
CO1	The student will be able to develop their intellectual, personal and professional abilities.
CO2	The student will be able to acquire basic language skills, listening, speaking, reading and writing.
CO3	The student will be able to acquire the linguistic competence necessarily required in variouslife situation
CO4	The student will be able to communicate with speakers of English language

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES

COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**

Category	Language
Approval	46th Meeting of Academic Council held in Aug, 2017

UAH17CT106	**BASIC OF COMPUTERS**
	Total Contact Periods – 30
	Total credits -4
	Course Designed by – Department of English
OBJECTIVES	This course is designed for students to develop basic understanding of used of computer and its applications in Clinical Departments

UNIT I: INTRODUCTION

Computer basics – Types of computers – hardware components – input devices – output devices – storage devices
– memory – units and sizes – factors affecting performance – operating systems – applications software – networking – LAN and WAN – Accessories – backup – computer virus – software copyright.

UNIT II: WORD PROCESSING

Windows – Office automation – WORD processor – open a new document – toolbars – menus – font dialog box –enter text – scroll – spelling checker – Autocorrect – undo and redo – bullets and numbered lists – indenting – moving and copying – find and replace – auto shapes – saving document – preview and print.

UNT III: ELECTRONIC SPREADSHEET AND DATA PRESENTATION

EXCEL spreadsheet – grid of rows and columns – active cell – selecting range – entering data – editing data – row and column labels – adjusting width – creating and copying formulae – relative – logical functions – lookup function – creating chart – bar chart – pit chart – print and save.

POWERPOINT presentation – creating slideshows- building outline – switching levels in outline – adding pictures – slide designs – design templates – formatting – color scheme – customized backgrounds – inserting content – hyperlink – revolution in education.

UNIT IV: DATABASE MANAGEMENT SYSTEM

ACCESS database – concept – template –primary key – records and fields – Student roster database – input mask

– adding records – viewing data – updating entries – searching and querying – sorting – Table, forms and reports.

UNIT V: APPLICATIONS IN HEALTHCARE AND MEDICINE

INTERNET – e-governance – access to information – communication facility – mechanics of E-mail – social transformation – electronic billing – drug information –information flow in lab and radiology – storage of medicalrecords – networking the organization – patient care – intelligent monitoring – scholarly information – health informatics – robotic assisted surgery – Clinical decision support systems – Telemedicine.

COURSE OUTCOMES	
CO1	The student will be able to develop basic under-standing of computer use.
CO2	The student will be able to acquire knowledge on Applications of computers in clinicaldepartments.
CO3	The student will be able to have the detailed knowledge on how to use hospital informationsystems.
CO4	The student will be able to communicate with speakers of English language

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES

COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**

Category	Basic Science
Approval	46th Meeting of Academic Council held in Aug, 2017

UAH17CT107	**MICROBIOLOGY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Microbiology
OBJECTIVES	This course is designed to enable students to acquire understanding of fundamentals of microbiology and identification of various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

UNIT – I: General Bacteriology

Introduction & History of Microbiology, Classification & Morphology of Bacteria, Growth & nutrition, Culture Media & Methods, Sterilization & Disinfection, Fundamental aspects of antibacterial agents and antimicrobial susceptibility testing.

UNIT – II: Immunology

Infection, Immunity, Immunization schedule, applications of antigen antibody reactions, Hypersensitivity, Tumor & Transplantation Immunology.

UNIT – III: Virology

Introduction to virology, viral hepatitis, poliomyelitis, Rabies, Human immunodeficiency virus.

UNIT – IV Mycology & Parasitology

Introduction to mycology, pathogenic yeasts & fungi, Introduction to parasitology, Amoebiasis, Malaria, Helminthic infections.

UNIT – V: Applied Microbiology

Outline of common bacterial diseases, treatment & prevention-Respiratory tract infections (upper & lower), Meningitis (septic & aseptic), Enteric infections (food poisoning & gastro enteritis), Anaerobic infections, Skin & soft tissue infections, Urinary tract infections, Sexually transmitted diseases, Tuberculosis & Leprosy, Hospital acquired infections, Biomedical waste management.

PRACTICAL EXERCISES: Spotters, Gram staining.

Reference Books

1. Textbook of Microbiology by Ananthanarayan & Panicker‟s, 8th edition-Universities Press (India) PVT LTD.

2. Textbook of Microbiology by C. P. Baveja, 4th edition, Arya Publications.

3. Textbook of Medical Parasitology, CK Jayaram Paniker, 5th edition, Jaypee Publications.

4. Medical Parasitology by C. P. Baveja & V. Baveja, 2nd edition, Arya

5. Publications.

COURSE OUTCOMES	
CO1	The student will be able to understand the morphological characters of bacteria.
CO2	The student will be able to master the preparation of smear, fixation and staining of bacterial smears and its quality control methods
CO3	The student will be able to learn to use microscope , autoclave, hot air oven, water bath, steamer, filters
CO4	The student will be able to differentiate between innate and adaptive immunity, and explain the main defences lines as well as biological barrier to the infections.

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES

COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**

Category	Basic Science
Approval	46th Meeting of Academic Council held in Aug, 2017

UAH17CT108	**PATHOLOGY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Pathology
OBJECTIVES	This course is designed to enable students to acquire understanding of fundamentals of microbiology and identification of various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

UNIT-I: General Pathology I: Cellular Pathology, Acute and Chronic Inflammation, Tissue Renewal Regeneration and Repair, Hemodynamic Disorders Thromboembolic Disease and Shock

Introduction to Pathology, Adaptations Of Cellular Growth And Differentiation, Causes Of Cell Injury, Mechanisms Of Cell Injury, Necrosis, Apoptosis, Pathologic Calcification, Cellular Aging, Acute Inflammation – Mediators Of Inflammation Outcomes Of Acute Inflammation, Morphologic Patterns Of Acute Inflammation, Chronic Inflammation – Causes Of Chronic Inflammation, Granulomatous Inflammation, Healing By Repair, Scar formation And Fibrosis, Cutaneous Wound Healing, Healing By First Intention, Healing By Second Intention, Edema, Hemostasis and Thrombosis, Infarction, Shock

UNIT-II: General Pathology II: Diseases of the Immune System, Neoplasia, Environmental And Nutritional Disease, Diseases Of Infancy And Childhood

Innate Immunity, Adaptive Immunity, Components Of The Immune System, Mechanisms Of Hypersensitivity Reactions, Acquired Immunodeficiency Syndrome (AIDS), Neoplasia – Definition and Nomenclature, Characteristics Of Benign And Malignant Neoplasm‟s, Molecular Basis Of Cancer, Essential Alterations For Malignant Transformation, Clinical Aspects Of Neoplasia, Laboratory Diagnosis Of Cancer, Common Environmental And Nutritional Pathology, Nutritional Diseases, Tumors And Tumor-Like Lesions Of Infancy And Childhood

UNIT-III: Systemic Pathology I: Blood Vessels, the Heart, Red Blood Cell and Bleeding Disorders, Diseases Of White Blood Cells

Arteriosclerosis, Atherosclerosis, Hypertensive Vascular Disease, Ischemic Heart Disease, Hypertensive Heart Disease, Valvular Heart Disease, Infective Endocarditic, Rheumatic Fever And Rheumatic Heart Disease, Cardiomyopathies, Leucopenia, Anemia‟s, Polycythemia, Bleeding Disorders, Reactive Proliferations Of White

Cells, Definitions And Classifications of Lymphoid Neoplasm‟s and Myeloid Neoplasm‟s, Splenomegaly.

UNIT-IV: Systemic Pathology II: The Lung, The Gastrointestinal Tract, Liver And Biliary Tract

Acute Respiratory Distress Syndrome, Obstructive Pulmonary Diseases, Pulmonary Infections, Gastritis, Peptic Ulcer Disease, Inflammatory Bowel Diseases, Liver Function Tests, Hepatic Failure, Cirrhosis, Portal Hypertension, Jaundice, Cholelithiasis

UNIT-V: Systemic Pathology III: The Urogenital System, the Breast, the Endocrine System, Bones Joints and Soft-Tissue, Peripheral Nerve and Skeletal Muscle, the Central Nervous System

Renal Function Tests, Nephrotic Syndrome, Nephritic Syndrome, Urolithiasis, Pap Smear, Carcinoma Of The Breast-Types And Classification, Thyroid Gland – Hyperthyroidism, Hypothyroidism, Thyroiditis, Graves‟ Disease, Diffuse And Multinodular Goiters, Parathyroid Glands – Hyperparathyroidism, Hyperparathyroidism, Diabetes Mellitus, Fractures, Osteomyelitis, Arthritis, Osteoarthritis, Rheumatoid Arthritis, Infectious Arthritis, Diseases of Peripheral Nerve, Diseases of Skeletal Muscle, Infections of CNS – CSF Find

REFERENCE BOOKS

1. Pocket companion to Pathologic Basis of Disease by Robbins and Cotran, 7th edition, Saunders.
2. Pathology Quick Review and MCQs by Harsh Mohan, 2nd edition, Jaypee Publications.

COURSE OUTCOMES	
CO1	The student will be able to gain knowledge of general pathology.
CO2	The student will be able to gain knowledge pathology of neoplasms.
CO3	The student will be able to gain knowledge of basics of community health.
CO4	The student will be able to gain knowledge of systemic pathology.

MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES

COs\POs	a	b	c	d	e	f
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**

Category	Basic Medical Science
Approval	46th Meeting of Academic Council held in Aug, 2017

UAH17CT109	**PHARMACOLOGY**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Pharmacology
OBJECTIVES	This course is designed to help the students to develop an understanding of basic knowledge of pharmacology and knowledge of common drugs/group of drugs

UNIT-I: General Pharmacology

Introduction to pharmacology-various terminologies-sources & routes of drug administration – Absorption & Factors modifying drug absorption – Distribution of drugs – Metabolism: Phase II, - Excretion: routes, modes & kinetics of elimination – Excretion – Mechanism of drug action in brief, synergism & antagonism and Factors modifying drug action – Adverse drug reactions – ADR reporting & monitoring – Drug interactions.

UNIT-II: Central Nervous System & Respiratory System

Introduction to CNS and Neurotransmitters, drugs used in insomnia, Sedatives and hypnotics – diazepam – alprazolam, anti-anxiety drugs, Antiepileptic – phenytoin, carbamazepine, sodium valproate,General Anesthetics – halothane, isoflurane, sevoflurane – Local Anesthetics – lignocaine – list of other drugs, Alcohols – ethyl alcohol – disulfuram, Anti parkinsonians – levodopa – carbidopa, Opioids – morphine – naloxone – tramadol – pentazocine, NSAIDs – aspirin – diclofenac – ibuprofen – paracetamol – Cox 2 inhibitors. Drugs used in bronchial asthma and cough

UNIT-III: Cardio vascular system & blood

Drugs used in Ischemic Heart Disease-nitrates-Calcium channel blockers-nifedipine, verapamil-list of other drugs – Beta blockers – propranolol, atenolol – metoprolol and antiplatelets – aspirin, clopidogrel, and names of other drugs-fibrinolysis drugs-streptokinase and other drugs, Drugs used in CCF-digoxin and list of other drugs useful in CCF, Shock. Diuretics: 4 groups – Thiazides, Loop diuretics, Potassium sparing and osmotic diuretics. Hypertension – outline of drugs used in hypertension, Rennin angiotensin system – ACE inhibitors – captopril, ramipril and names of other drugs – Receptor antagonist – losartan and list of other drugs, Antiarrhythmic drugs-classification – Quinidine, Lignocaine and amiodaron – Drugs for Hypercholesterolemia – statins. Drugs for anemia – oral & parenteral iron preparations, folic acid, vit B12 and erythropoietin. Coagulants and anti-coagulants

UNIT-IV: Hormones and GIT

Contraceptives – oral and injectable, Corticosteroids – glucocorticoids – hydrocortisone-prednisolone-dexamethasone and names of topical steroids – Insulin – Oral hypoglycemic – sulphonyl ureas, biguanides and others, Thyroid and Antithyroid drugs, Sex Hormones-Estrogen and anti estrogens, Progestin and Anti progestin‟s, Androgen And anti androgens. Emetics and anti emetics- metoclopromide and domperidone, Drugs used in peptic ulcer, constipation-lactulose & Diarrhea-ORS- Loperamide.

UNIT-V: Chemotherapy and Miscellaneous

Introduction – Beta lactam antibiotics: Penicillin‟s – natural, semi synthetic penicillin‟s – amoxicillin – cloxacillin-clauvulinic acid – sulbactum – Cephalosporin‟s – cephalexin – cefuroxime – cefixime – ceftrioxone-cefipime, Broad spectrum antibiotics – Doxycycline – chloramphenicol-imipenum-Macrolides – erythromycin, azithromycin and others – Quinolones- ciprofloxacin and list of other drugs and sulfonamides- cotrimoxazole- Amino glycosides-gentamycin, amikacin and names of other drugs Anti TB-first line drugs, Anti leprosy-dapsone and clofazimine Anti-malarial- chloroquine- mefloquine and artemisinins, Anti-fungal- amphotericin B- fluconazole and topical drugs & Anti-viral drugs- acyclovir and anti HIV, Anti protozoals- metronidazole – Anthelmintics- albendazole- praziquantel.

Anti-cancer drugs-Introduction – Anti metabolites- methotrexate- 6 mercapto purine- Alkylating agents-cyclophosphamide- busulphan and cisplatin – Plant products- vinblatin- vincristine- taxanes, antibiotics-actinomycin D- monoclonal antibodies. Immuno modulators- cyclosporine, tacrolimus, azathioprine and steroids. Toxicology-Drugs used in common poisoning, organophosphates, methyl alcohol, Benzodiazepam.

REFERENCE BOOKS:

1. Lippincott‟s Illustrated Reviews: Pharmacology, 5th edition, by Richard A. Harvey and Pamela C. Champe,Lippincott Williams & Wilkins Publisher
2. Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers.

COURSE OUTCOMES						
CO1	The student will be able to gain basic knowledge in pharmacology.					
CO2	The student will be able to gain knowledge of detailed systemic pharmacology.					
CO3	The student will be able to gain knowledge of detailed knowledge of drugs and groups of drugs.					
CO4	The student will be able to gain knowledge of action of drugs					
MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CT110	**ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Community Medicine
OBJECTIVES	This course is designed for students to practice community health nursing for theindividual, family and groups at both urban and rural settings by using concept and principles of health and community health nursing. It also is designed for students to understand the natural resources and environmental pollution

UNIT – I:

Natural Resources: Introduction, Multi-disciplinary nature of environmental studies, Earth Resources and Man, Renewable and Non-Renewable Resources, Water Resources, Mineral Resources: Food Resources: Effect of modern agriculture, Fertilizer/pesticide problems, Water logging, and salinity, Energy Resources.

Ecosystems: Concept of an Ecosystem, Structure and Functions of an Ecosystem, Producers, Consumers and Decomposers, Cycles in the Ecosystem

Biodiversity: Introduction, Definition: Genetic, Species, Ecosystem diversity, India as a Mega Diversity Nation, Hotspots Of Biodiversity Threats to Biodiversity. Poaching of Wildlife, Man-Wildlife Conflicts, Endangered and Endemic Species Of India, Conservation of Biodiversity

UNIT – II:

Pollution: Definition, Causes, Effects and Control Measures of Air Pollution, Water Pollution, Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards, Solid Waste Management role of Individuals in Pollution Prevention.

Social Issues Human, Population and Environment: From Unsustainable To Sustainable Development, Urban Problems Related To Energy, Water Conservation, rain Water Harvesting, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust. Environment Protection Act.

UNIT – III:

Concept of health & disease: Concept of health, Definition of health, Philosophy of health- Dimension of health – Concept of wellbeing, Spectrum of health, Responsibility of health – Determinates of health & Indicators of health – Concepts of disease & Concepts of cessation – Natural history of disease – Iceberg

phenomenon, Concepts of control – Concepts of prevention – Modes of Intervention, Changing pattern of disease.

UNIT – IV:

Epidemiology: Definition & explanation, Aims, Epidemiologic approach, Basic measurements in epidemiology & tools of measurements – Measurements of Mortality & Morbidity, Epidemiologic methods- Descriptive epidemiology-Analytical epidemiology – case control study – analytical epidemiology – Cohort study – Experimental epidemiology – RCT – Association & Causation Uses of epidemiology (Criteria for judging causality) – Infection disease epidemiology Definitions Dynamic of disease transmission & Modes of transmission – Disinfection – Definition Types Agents used Recommended disinfection procedures-Investigation of an epidemic.

Unit – V:

Environment & health: Definition & components (environment sanitation environmental sanitation) Water: Safe & Whole some water Requirements Uses source of water supply (sanitary well)-Purification of water (1). Large scale purification, (2). Small scale purification – Water Quality – Special treatment

of water

Air: Composition The air of occupied room discomfort. Air pollution & its effects. Prevention & Control of air pollution

Ventilation: Definition Standards of ventilation Types of ventilation. Light, Noise & Radiation, Metrological environment, Housing, Disposal of waste Excreta disposal

PRACTICALS:

1. Epidemiology Problems
2. Environmental spotters

REFERENCE BOOK

1. Textbook of Preventive and Social medicine by k. Park, 21st edition, published by Banarsidas Bhanot

COURSE OUTCOMES						
CO1	The student will be able to know the concept of health & illness					
CO2	The student will be able to know epidemiology of common communicable diseases					
CO3	The student will be able to know epidemiology of common non communicable diseases					
CO4	The student will be able to know the effects of pollution on humans.					
MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CT111	**BASICS OF NURSING**
	Total Contact Periods – 80
	Total credits -5
	Course Designed by – Department of Nursing
OBJECTIVES	This course is designed to help the students to develop an understanding of the nursing profession, philosophy, objectives, theories and application of nursing in various clinical settings. It is aimed at helping the students to acquire knowledge, understanding and skills in techniques of nursing and practice them in supervised clinical settings.

Unit I: Introduction of Health

Health care system, major health problems of the country, nature of disease pattern, technological advances and national health programmes, health for all by 2000 AD. Role of health care workers in the health care delivery system, impact of illness of the individual family and community. History of Nursing, Communication Skills -Relationship with patients, process of communication

UNIT II: Concept of Nursing

Nursing Processes- Problems solving approach, assessment, diagnosis, planning, implementation and evaluation.

Unit III: First Aid and Nursing in Emergencies

Definition, basic principles, scope and rules, Wounds, hemorrhages, shock, fracture, dislocation and muscle injuries, respiratory emergencies, resuscitation, unconsciousness, Miscellaneous conditions, burns, scalds, foreign bodies in the skin, eyes, ear, nose, throat and stomach.Frost bite, effects of heart cramps, bites and stings. Poisoning, Transporting injured persons.

Unit IV: **Personal Hygiene and Health**

Care of skin, mouth, eyes, nails, hair, Menstrual hygiene, clothing, mental health, common health problems of poor personal hygiene. Comfort, Rest and Sleep, Hospital Housekeeping

Unit V: Health Education

Introduction to principles and methods of health education. Use of audio visual aids, mass education, role of nurse in health education.

COURSE OUTCOMES						
CO1	The student will be able to gain knowledge on concept of health, health-illness continuum and health care delivery system.					
CO2	The student will be able to gain knowledge on scope of nursing practice.					
CO3	The student will be able to gain knowledge on concept, theories and models of nursing practice.					
CO4	The student will be able to gain knowledge on concept, theories and models of nursing practice.					
MAPPING BETWEEN COURSE OUTCOMES& PROGRAMME OUTCOMES						
COs\POs	**a**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17RIS201 - ANATOMY, PHYSIOLOGY, PATHOLOGY AND PHARMACOLOGY RELATED TO RADIOLOGY

Course Objective

An outline of anatomy, physiology, and pathology will be provided to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Unit I: Introduction and general considerations

- **General**- Topographical and other general terms employed, Cell structure and function, Tissues-differentiation, Bone structure, development and ossification
- **Skin**-Elementary account of structure and physiology of the skin with special reference to the effects of Radiation**.**
- **Ductless Glands-** Surface markings, thyroid gland and parathyroid, suprarenal glands, pituitary gland, thymus gland and pineal body.
- **Pathology in Relation to Radiographic Applications / General Pathological Terms-**Inflammation – pyrexia, ulcer, bacteria and the specific granulamata neoplasms benign, malignant, with some examples.
- **Lymphatic System**
  Surface markings, tonsils, elementary physiology of the lymphatic system.

Unit II: MUSCULOSKELETAL SYSTEM

- **Osseous System**
  Detailed description of bones and joints of the upper limb, shoulder girdle, lower limb, pelvic girdle, vertebral column, thorax, skull and their Radiographic appearance. Skull with reference to nasal bones, sinuses, temporal bone & teeth.
- **The Muscular System**

Voluntary and involuntary muscles with special attention to the following: Sternocleidomastoids, pectoralis major, diaphragm, iliopsoas, deltoid, supraspinatus, biceps, triceps, brachialis, quadriceps femoris, erector spinae.

Unit III: Cardio-respiratory, alimentary and urinary systems

- **The Cardiovascular System**

  Structure and function of heart and main vessels. Their principal relations and the surface markings on main structure of the chest. Composition of blood. Radiographic appearances of heart and aorta in various projections.

- **The Respiratory System**

  Structure, position and function of nose, pharynx, larynx, trachea, bronchi, lungs and pleura with surface markings, anatomy and significance of the mediastinum.

- **Elementary Physiology of Respiration**

  Radiographic appearance of the larynx, pharynx and trachea of the chest in various projections.

- **The Alimentary System**

  Structure, position and function of the buccal cavity, tongue, salivary glands, pharynx, esophagus, stomach, small intestine, large intestine, liver, gall bladder and pancreas. Radiographic surface markings.

- **The Urinary System**

  Structure, position and function of kidney, ureters, bladder and urethra. Radiographic surface markings.

Unit IV: Nervous System, reproductive system and elementary pathology

- **The Nervous System**

Spinal cord, meninges, secretion and circulation of the CSF. Radiographic appearance of the central nervous system following use of contrast media.

- **Reproductive System**

  The uterus and tubes as shown by the injection of opaque media. Anatomy of male reproductive system.

- **Elementary Pathology of Common Conditions**

  Benign tumors, malignant tumors, epithelial tumors, connective tissue tumors, nervous tissue tumors, tumors of the haemopoietic and reticulo-endothelial system, leukemia.

Unit V: Contrast media and patient care

- **Contrast Pharmacology**

Types of contrast media. Ionic and non-ionic contrast media. Testing of sensitivity administration of proper dose. Advantages of non ionic contrast media. Mild to major reactions and management of the same.

- **Patient Care in Radiology Department-Care and comfort** of the patient, Handling of patient – fracture cases lifting of injured patients. **Records of patients.** Temperature, pulse, respiration, setting of trays for various **examinations, simple instruments.** (syringes and needles – Higginsen's syringe – catheters, tourniquets etc) treatment of shock – surgical – electrical, first aid for such occurrences as fainting, vomiting, epilepsy, etc, common medical and surgical terms. **Psychological approach** to patient as an individual not as a case in relation to pathological condition – handling of fracture cases – stretcher and bed patient – method of dealing with helpless patients – ventilation and temperature of X-ray room and cross infection – **general hygiene** – organization to avoid delay – waiting and restrooms – special apparatus for children

1. **Radiographic Surface Anatomy**
2. **Contrast Agents**
3. **Spotters**
4. **Skeletal anatomy**
5. **Film discussion**
6. **Charts**

UAH17RIS202 - RADIOLOGICAL PHYSICS AND DARK ROOM TECHNIQUES

Course Objective

This course will provide an introduction to concepts in radiation physics radiation instrumentation, radiation safety and film processing so that the students can better understand the operations of radiation detectors and radiographic film processing.

Unit I: Radiation Physics X-Rays

Electro magnetic radiations, waves and quanta, rectilinear propagation, inverse square law, general electro magnetic, spectrum, production and properties of X-rays.

X-ray Spectrum: characteristic radiation and bremstrahlung radiation. Effects of variations in the tube potentials.

Unit II: X-Rays and Matter

Elementary outline of absorption of x-ray by matter, secondary electron emission, Compton & photoelectric absorption of x-rays by light elements variations with wave length, scattering of x-rays, practical aspects of these phenomenon in radiology. Lionization by x-rays. The definitions of the roentgen.

Unit III: Radiation Protection

Principles of protection in x-ray department, measurements of stray radiation, Radiation units. ICRP and AERB recommendations. Biological effects of ionizing radiation, TDS, ALARA, X-ray room design.

Unit IV: X-Rays Measurements

Methods of measuring x-rays ionization measurement – realization of line roentgen parallel plate chamber. Principles of integrating, direct reading and condenser dosimeters half value layer. Film dosimetry, TLD, Pocket dosimeter, chemical dosimetry, biological dosimetry, scintillation defectors, solid state detectors, GM counter ionization chamber, proportional counter.

Unit V: Dark Room Techniques

Ideal dark room-construction-accessories-safelight, wet bench, dry bench, types of films, types of hangers, Automatic film processor-analysis the various parts of the unit maintenance, required chemicals and monitoring, Manual film processing-contents of developer and fixer-need of water bath, rinsing and various methods of drying, Types of films, manufacture of films, storage of films, film definition-density and contrast, characteristic curve, image defects, artifacts, film cassettes types of intensifying screens. Artifacts in Radiography.

1. **Radiation survey**
2. **Leakage radiation test**
3. **Manual Film Processing**
4. **Automatic film processing**
5. **Effects of temperature on film processing**
6. **Effect of pH on film processing**

UAH17RIS203 - BASIC PRINCIPLES OF HOSPITAL MANAGEMENT

(Common to all specialties – Anesthesia Technology, Cardiac Technology, Clinical Laboratory Technology, Renal Dialysis Technology, Radiology & Imaging Science Technology, Perfusion Technology, Cath Lab Technology & Blood Banking Technology)

Unit I: Introduction to management & Organization:

The evolution of Management, Definition and importance of Management. Planning – Organizing – staffing – Motivating – Leading – Controlling. Management of health care units (in brief). Individual behaviour in organization; organizational functioning (Group/Individual); Perception; Motivation MBO; Organizational Development.

Unit II: Planning and Management of Hospitals & Clinical Services:

Building and physical layout – space required for separate function – Planning of infrastructure facilities, clinical services, equipment & Human resources – Types of Hospitals. Organization and administration of various clinical services; outpatient services. In-patient services, emergency services, operation theatres, ICU's and super specialty services.

Unit III: Organizing of support clinical services & Hospital management:

Imaging – CSSD – Laboratory – Blood Bank – diet – Medical Records – Mortuary. Housekeeping – Maintenance (Water, Electricity, Civil, Air Conditioning, Lift) – Pest Control – transport – Security.

Forecasting – Purchasing & procurement (Sourcing, methods and procedures) – Storing & issuing, Concept of inventory control, Maintenance of equipments and contracts (with special reference to major biomedical equipments). Trends in financing of Health and Hospital Services – Classification of Hospitals depending on source of financing – roles of financial institutions.

Unit IV: Personnel and quality Management in Hospital & Marketing:

Concepts – Manpower planning – Training & Developments – Team Building – Conflict Management – Performance appraisal – Office rules and regulations Outline of Strategic Planning and Marketing.

Concepts of quality – Professional Audit System – QA program – Medical Audit – Quality Circle – TQM – Patient Satisfaction – ISO 9000. A brief outline – computerization in hospital departments. Concept, Techniques, Indicators, Evaluation of Efficiency & Effectiveness evaluation of hospital and medical care services.

Unit V: Ethical, current issues and Legal Aspects of Hospitals management services:

Laws related to Hospital – Medico Legal Cases law of Torts – Autopsy – Dying declaration – CPA. – Waste Management – Telemedicine – Organ Transplantation – Rehabilitation Service – Health Insurance.

Operations Research and Quantitative Methods in Hospital Administration & Nursing Services in a Hospital.

UAH17RIS204 - COMPREHENSIVE VIVA: ANATOMY, PHYSIOLOGY AND PHARMACOLOGY RELATED TO RADIOLOGY(IE)

SEMESTER 4

UAH17RIS205 - HEALTH CARE MANAGEMENT

Course objective

1. To learn about development and evaluate the health programs.
2. To learn about various health policies

Course outcome

1) To know orientation about the health organization and policy.

2) To familiarize students with the basics concept of health policy and national health program.

UNIT I: Concept of Health Care and Health Policy

Health in Medical Care, Indigenous systems of Health Care & their relevance, Framework for Health Policy Development.

UNIT II: Health Organisation

Historical development of Health Care System in the third world & India, Organization & Structure of Health Administration in India, Type of Health Organization including International Organizations, Private & Voluntary Health care provider, Distribution of Health Care Services, Health Care System in Public Sector Organization, Health systems of Various Countries.

UNIT III: Health Policy and National Health Programme

National Health Policy, Drug Policy, National Health Programs (Malaria, T.B., Blindness, AIDS etc.), Evaluation of Health Programs (Developing indicators for evaluation), Medical Education & Health Manpower Development.

UNIT IV: Health Economics – Fundamentals of Economics

Scope & Coverage, Demand for Health Services, Health as an Investment, Population, health of Economic Development.

Economics of Health – Population based health services, Economics of Communicable and Non Communicable diseases.

UNIT V: Methods & Techniques of Economic Evaluation of Health Program

Cost Benefit & Cost Effective Methods.

- **Household & Health**

Health Expenditure & Outcome, Rationale for Government action, Household capacity, income and schooling

- **Health Insurance.**

Reference Book

1. Introduction to Health Care Management by Sharon Bell Buchbinder, Nancy H. Shanks, Dale Buchbinder

2. Healthcare operations management by Danial B

UAH17RIS206 - POSITIONING RADIOGRAPHY AND CONTRAST PROCEDURES

Course objective

This course will cover fundamental or radiography including radiographic techniques for individual systems, reproduction of radiographs and radiation protection.

Course Outcome

1. Students have a knowledge about contrast materials and procedures.
2. Gain adequate knowledge to handle the emergency patients and describe the film.

Unit I: Practice on the patient

- Age, subject types and sex, anatomical landmarks-postural variations-erect and horizontal technique-respiratory movement and diaphragm level-regional densities-preparations-and immobilization of patient-pathological conditions-injuries, fractures and dislocations congenital, localized views-periodic examinations-use of dry bones-positioning terminology identification systems.
- The position of the patient, the relative position of the tube to the patient and to all the exposure factors.

Unit II: Upper limb, Lower limb and Pelvic Girdle

- Techniques for hand-fingers-thumb-wrist joint-forearm-elbow joint-humerus-shoulder joint and sterno-clavicular joint.
- Techniques for foot-calcaneum-ankle joint-leg-knee joint-patella-and femur (lower two thirds).
- Techniques for pelvic-iliac fossa-ischium and sacro iliac joint.

Unit III: Vertebral column, Bones of Thorax and skull

- Techniques for Atlanto-occipital articulation, cervical vertebrae, cervico-thoracic junction, thoracic vertebrae, lumbar vertebrae, lumbosacral articulation, sacrum, coccyx.
- Techniques for sternum, ribs (upper and lower).
- Techniques for cranium, facial bone, sella turicica, temporal Bone and optic foraminae, sinuses, mandible and temporo mandible joint.

Unit IV: Abdomen

Routine and radiographs on acute condition

Bedside radiography-techniques for acute chest condition-intestinal obstruction, abdominal perforations-vertebral injuries-skull injuries-fractures immobilized. Theater radiography-introduction to C-arm image intensifier-exposure and training.

Unit V: Contrast Procedures

Barium swallow-Barium meal series-Barium enema-double contrast barium enema, small bowel enema, double and single contrast, ERCP, PTBD, sonograms, fistulograms, mammograms, IU, retrograde pyelogram, MCU, AUG, Opposing Urethrogram. Sialogram, darocystogram, HSG, T-Tube cholangiogram, operative cholangiogram (on table in theatre), Radiographic image processing.

1. **Contrast procedures**
2. **Film Criticism**
3. **Handling patient**
4. **Pre-medication and post-medication**
5. **Crash cott**
6. **SPOTTERS / CHART**
7. **Radiographic materials**

Reference Book

1. Positioning in Radiography – by Clark's
2. *Radiographic Positioning and Procedures – by Merrill's Atlas*

UAH17RIS207 - RADIOLOGY EQUIPMENTS

Course objective

1. To learn about Radiological instrumentation and physics concepts.
2. Quality assurance test procedures.
3. Machine accessories and maintenance.

Course outcome

1. Students know about positioning the patient during imaging procedures.
2. To learn about various imaging with contrast procedures

Unit I: Radiological Physics, Apparatus

- Introduction to general properties of radiation and matter. Fundamentals of nuclear physics and radioactivity, production of x-rays, Film characteristics, Contrast, Artifacts in radiography, Interaction of x-ray and gamma rays with matter and their effects on irradiated materials. Interaction of x-rays with patients, radiation protection, Quality assurance, Minature radiography, macro radiography and magnification techniques.
- Distribution of electric power.
- Mains-compensators-stabilizers-single phase-three phase mobile supply cable capacity, voltage drop-main switches, fuses earthing-effects of frequency variations.

Unit II: Transformers, Control of output

- Construction-closed or open-core-voltage and power relations, functions of core-losses and regulations-copper losses, iron losses-hysterisis and inherent regulations. Types of transformers high insulation transformers-condensor effect.
- Resistance control of primary transformer control of primary (acute transformer) dual control-continuous central.

Unit III: HT General Circuits and Distribution, X-ray Tubes

- Valve and metal rectifiers-mechanical rectifiers-self-suppression types of generators radiographic half-wave, three phases condenser-therapeutic-pulsating, HT distribution-bus bars stress shield chokes, electrical protection, inter-locks, safety devices.

- Construction-loading-rating, line focus, Dual focus-Rotating anode tube-principle of methods of cooling-grid tubes-X-ray proofing-proofing (Tubes cables) minimum requirements.

Unit IV: Instruments and Controls, Accessories

- Milliammeters-milliampere-second meter-kilovolt meters-direct and prereading layout of control desk contractor automatic and interlocked controls-exposure switches (clock work electronics, synchronous electric photoelectric). Mammography, Digital radiography, OPG, craniostat, Mobile X-ray equipment for operation theatres, Dual energy X-ray absorptiometry.
- Moving grids, stationary grids curved and flat grids-focused and non focused grids. Bucky tables, stands and pedestals, screening stands, serial devices, diaphragms, cones and applicators.

Unit V: Fluoroscopy

- Basic principle-assembly image intensifiers-camera-filters, magnification DSA-the angiographic room-the generators-the X-ray tube-image intensifier-cine camera and associated optics-the television chain-cine film selection-processing and viewing digital fluoroscopy-Radiation safety.

1. Testing X-ray beam and light beam alignment.
2. Magnification techniques with constant SID
3. Magnification Techniques with constant OID
4. Beam Alignment Test
5. Focal shot test
6. Grid alignment test
7. CHART/SPOTTERS

Reference book

1. *Fundamentals of fluoroscopy* - by Jeffrey D. Houston, Michael Davis.
2. HANDBOOK OF BIOMEDICAL *INSTRUMENTATION* - by McGrew hill
3. The Physics of Radiology and Imaging - by THAYALAN K**.**

UAH17RIS208 - CLINICALS IN RADIOLOGY EQUIPMENTS AND POSITIONING RADIOGRAPHY AND CONTRAST PROCEDURES: COMPREHENSIVE VIVA(IE)

Course objective

This course will cover fundamental or radiography including radiographic techniques for individual systems, reproduction of radiographs and radiation protection.

Course outcome

1. Student know about positioning the patient during imaging procedure.

2. To learn about various imaging with contrast procedures.

SEMESTER 5

UAH17RIS301 - BASIC AND ADVANCED CT SCAN

Course Objective

1. To learn about concepts and theory of CT
2. To know advanced CT techniques
3. To know various CT procedures

Course outcome

At the end of the course, students will learn about the CT machine instrumentation, concepts, working principles and understanding of the benefits and risks of using a machine for a variety of applications. They gain knowledge about image reconstruction and documentation.

Unit I: Basic principle of CT scan, Generation of CT, Image formation in CT, Image quality Hounsfield unit, Detectors used in CT, X-ray tube,

Unit II: Patient preparation, Imaging techniques for Head, Chest, Abdomen and other parts.

Unit III: Contrast media in CT scan, Artifacts in CT, Image documentation, Safety regulation.

Unit IV: Basics of spiral CT scan, advantages of spiral CT scan, Electron beam CT, patient preparation-CTprotocols for various parts of body, CT contrast enhanced protocols-CT angiography-(aortogram, selective angiogram head, neck and peripheral angiography.).

Unit V: 3D processing and reconstruction-Different Rendering mode used in 3D Reconstruction-HRCT-image documentation-image filing-documental maintenance.

1. **Brain scanning Protocol**
2. **CT Chest scanning Protocol**
3. **CT Abdomen scanning Protocol**
4. **CT Angiography Protocol**
5. **Image processing in workstation**
6. **CT Biopsy Protocol**

UAH17RIS302 - BASIC AND ADVANCED ULTRASOUND IMAGING

Course objective

1. To learn about concepts and theory of ultrasound machine
2. To know advanced advanced techniques

Course outcome

Students have a good knowledge about ultrasound machine parts, different type of transducers and uses for various techniques. Adequate knowledge about ultrasound room layout construction and maintenance.

Unit I: Ultrasound Physics: Ultrasound units, Transducer techniques for imaging different anatomic areas, Different types of Transducer, Ultrasound artifacts.

Unit II: Ultrasound anatomy, Patient Preparation, Biologic effects and safety, Contrast agents in Ultrasound, Quantitive ultrasound densitometry.

Unit III: Doppler physics-Doppler artifacts-doppler techniques-tissue harmonic imaging, seascape imaging-Hybrid imaging-Thermography

Unit IV: 3D and 4D Ultrasound Imaging, patient preparation for Doppler, Vascularsonography.

Unit V: Musculoskeletal sonography, basic echocardiography, interventional sonography, intra-operative sonography.

1. **USG abdominal imaging.**
2. **USG Neck imaging**
3. **Doppler evaluation**
4. **Advanced Ultrasound Imaging**
5. **Spotter / Image discussion**

Reference book

1. Physics for medical imaging – by farr's
2. Basic radiological physics – by thayalan

UAH17RIS303 - HOSPITAL PRODUCTS, PROMOTION, SALES & PUBLIC RELATIONS

Course Objectives

1. To educate them on the importance of patient education, to understand the outpatient and inpatient registration process and to make patient satisfaction and patient records.
2. To make them understand the importance of coordination among various departments in hospitals.

Unit I:

- **An introduction to Marketing**

  Role of marketing in Business management – Evolution and definition of marketing – Concepts of Marketing – Service vs. Products – Management of Service Management process

- **Service Marketing**

  Classification of services – Characteristics of services and their marketing implication – Selecting appropriate tools for marketing

Unit II:

- **Component of Service Marketing**

  Product Planning, Market research system – Market segmentation – Targeting – Positioning – Launching new service – Concept of product life cycle, Pricing, Setting the price – Economic Theory – Responding to price change, Physical Distribution, Major Aspects – Channels of distribution – Selection of channel, Promotion, role of communication – Promotion mix – Advertising (Media – budget – Cost effectiveness – (attributing to hospitals a human face – Good will – image building among major public), Sales promotion (techniques – Evaluation), Direct selling (Sales force – Evaluation), Physical Environment, Process, People Unit III.

Unit III:

- **Analysing Markets and Buyer Behaviour**

Model of consumer behaviour – Factors influencing buyer behaviour – Buying decision process.

- **Branding of a Hospital Facility**

  Brand name and concept – Positioning hospitals – Developing and USP – Brand image – Image building – long term and short term activities.

Unit IV:

- **Other Marketing routes for Health Care Units**

  Interpersonal communication – Print materials institutional marketing – seminars – conference.

- **Marketing Strategies for Hospital**

  Managing Differentiation – Service Quality – Productivity – Product support service.

Unit V:

- **Evaluating and Controlling Market Performance**

  Annual plan control (sales analysis – market share analysis – Marketing expense to sales analysis – Financial analysis), Profitability control, Efficiency control, Strategic control.

- **One case study related to Hospital Marketing**

OR

PHYSICIAN'S OFFICE MANAGEMENT

Course outcome

Students will have adequate knowledge about medical office management.

UNIT I. Outpatient Section

Registration of new cases, Registration of repeat cases, Patient record guide, Laboratory X-Ray reports & reports filing, Alpha index typing & Filing, O.P. Records coding (disease & indexing), O.P. records retrieval, O.P. Statistics

UNIT II. Inpatient Section

Admitting office procedure, Inpatient record removal & forwarding, Ward Census,

UNIT III. Assembling & deficiency checks, I.P. record coding & indexing,

UNIT IV. Discharge Analysis

Incomplete record control, Completed record control, Medico legal procedures & issue of Medical certification, Record retention & destruction of O.P. & I.P. records,

UNIT V. Miscellaneous

Hospital reception, Secretarial practice, Library (Medical)

Reference book

1. Medical Office Management – Christine Malone
2. Medical Office Management – Alice Anne Andress
3. The Business Side of Medicine – by MD Harbin Mba

UAH17RIS304 - CLINICALS IN BASIC AND ADVANCED ULTRA SOUND IMAGING: COMPREHENSIVE VIVA (IE) – 75 MARKS

SEMESTER 6

UAH17RIS305 - BASICS AND ADVANCED MRI

Course Objective

1. To learn about MRI parts
2. To learn working principles of MRI
3. To learn various types of coils and techniques.

Course outcome

Students have adequate knowledge about handling MRI machine and Various sequences for varies imaging.

Unit I:

Basic principle and concepts of MRI, the need for MRI, Role of hydrogen in MR Imaging Advantages and disadvantages of MRI,

Unit II:

MRI architecture, magnet system and gradient system

Unit III:

Patient screening before scanning, safety aspects

Unit IV:

Types of magnets and RF coils, different types of pulse sequence, fourier transformation, Inverse Fourier transformation, and K space imaging Image formation in MRI with & without gating image formation in MRI, maintaining image quality

Unit V:

MR Angiography, (dynamic contrast MR angiography, phase contrast and TOF) Functional MRI, MR spectroscopy, Recent advances in MRI and open MRI.

1. **MRI Brain screening Protocol demonstration**
2. **MRI Spine screening Protocol**
3. **MRI Angiography Protocol**
4. **MRI Musculoskeletal screening Protocol**
5. **Image processing in work station.**
6. **MR Advanced imaging Protocol**

UAH17RIS306 - INTERVENTIONAL RADIOLOGICAL PROCEDURES AND BASIC ANGIOGRAPHY

Course objective

1. To learn about catheter incision procedure and risk
2. To learn protocol for different procedures

Course Outcome

Students gain knowledge about angiography, venography procedure and how to manage the shock.

Unit I: Procedure of image guided biopsies and drainage procedure.

Unit II: Invasive Angiography and Venography, 4 Vessel DSA, aortogram, Selective Angiogram, Venogram.

Unit III: Invasive Monitoring, Cardiac resuscitation measures, Plethysomography, Interventional Procedures, PTBD, Stenting, Management of shock, PTA +stenting, stent graft, Embolisation Tips, drainage procedure.

Unit IV: Embolisation, GDC, Glue embolisation, Vertebroplasty, Direct puncture, Laser guided procedures, Adult and Paediatric Invasive Cardiology.

Unit V:

a) Basics of cardiac catheterization

b) Coronary angiogram

c) Cardiac interventional procedures

1. Catheter Intervention Procedures Protocol
2. Equipment handling
3. Image guided interventional procedure Protocol
4. Image processing in work station

Reference book

1. Handbook Of Interventional Radiologic Procedures - by Krishna Kandarpa
2. Vascular and Interventional Radiology - by Brian Strife MD (Author), Jeffrey Elbich (Author)

UAH17RIS307 - TRAUMA LIFE & CARDIAC LIFE SUPPORT

Course objective

Describe first aid and the role of first aide, Describe the purpose of emergency care. Outline steps of emergency care.

Course outcome

Students have adequate knowledge about various emergency life support

UNIT I. Trauma Life (Part 1)

- BLS
- TRIAGE
    a. Primary Survey
    b. Secondary Survey
- Airway & Ventilatory management
- Shock
- Central & peripheral venous access
- Thoracic trauma – Tension pneumothorax
- Otherthoracic injuries
- Abdominal trauma – Blunt injuries
- Abdominal trauma – Penetrating injuries

UNIT II. Trauma Life (Part 2)

- Spine and spinal cord trauma
- Head trauma
- Musculoskeletal trauma
- Electrical injuries
- Thermal burns
- Cold injury

UNIT III. Trauma Life (Part 3)

- Paediatric trauma
- Trauma in pregnant women
- Workshop BLS
- Workshop cervical spine immobilization
- Imaging studies in trauma

UNIT IV. CARDIAC LIFE SUPPORT (Part 1)

- BLS
- The universal algorithm for adult ECC
- Ventricular fibrillation/Pulseless ventricular tachycardia algorithm
- Pulseless electrical activity (PEA) / asystole algorithm
- Bradycardia treatment algorithm
- Tachycardia Treatment algorithm

UNIT V. CARDIAC LIFE SUPPORT (Part 2)

- Hypotension / Shock
- Acute myocardial infarction
- Paediatric advanced life support
- Airway management
- Defibrillation
- Drugs used in ACLS
- S Emergency Cardiac pacing
- AED
- Techniques for oxygenation and ventilation

Reference Book

1. First aid book-St Johns Ambulance services
2. Text book of Orthopaedics – Natarajan

UAH17RIS308 - CLINICALS IN ADVANCED MRI AND INTERVENTION RADIOLOGICAL PROCEDURE: COMPREHENSIVE (IE)

INTERNSHIP

Regulation for Internship

Internship is an important part of training wherein an Allied Health Science Graduate acquires skills, and applies his knowledge gained during his course of study.

Objectives:

1. To Facilitate Reinforcement of Training.
2. To Develop Professionalism, Communication and Team Building skills.
3. To help in understating of ethical Practices like
    - Rights and dignity of patients
    - Ethical Conduct and professional obligations to colleagues, patients, families and community

The Internship is compulsory for all the candidates. It shall commence after the students have completed and passed all academic and clinical requirements.

The internship shall be for a duration of one year.

The degree shall be awarded after satisfactory completion of internship.

EVALUATION OF INTERNEES

Formative and Summative evaluation are carried out. A **Log Book** is maintained by all internees. No Marks are allotted. Satisfactory completion of Log Book is essential for completion of internship.

Day to day assessment of the internees during the internship posting should be done (Log Book). Summative evaluation is based on observation of the supervisors of different department and their records in the log books. Based on the formative and summative evaluation the head of department shall issue certificate of satisfactory completion of training, following which the university shall award the degree.

During internship a project is allocated to each intern by the respective Heads of departments.
The project work is marked for 100 (including viva).
Six credits are given for the project
30 hours per credit
Total 180 hours
The Project is done for a Maximum duration of 6 months.

Internship credits

The internship is given 15 Credits. (i.e.) 45 hrs/Credit. A Total of 675 hours.

After Undergoing internship for a period of Six months, each Department shall conduct an **internal evaluation** of the student to assess the skills developed and progress of the student before issuing the certificate of completeness.
The duration of the posting and skill acquisition in various technology courses are attached.

Number of Working days for interns:-

All Sundays are holidays.

On Government holidays duties are allotted on turns to the interns. In cases of leave or absence extension of posting shall be given which is done at the discretion of Head of Department.

COMMON TO ALL BRANCHES

INTERNSHIP [VII & VIII SEMESTER]

Sl. No.	Programme	Hours Prescribed	University Examination			
			Project Evaluation	Viva	Total	Credits
1	Internship	675	-	-	-	15
2	Project	180	80	20	100	6
No Minimum for Passing			Total Credits			21

RADIOLOGY AND IMAGING SCIENCE TECHNOLOGY

OBJECTIVES

Practical training is given to the students who have completed successfully in all subjects year.

GUIDELINES

- Internship shall commence after the students have completed examination in all subjects successfully.
- Degree shall be awarded after satisfactory completion of internship.
- This would be certified by the immediate supervisor under whom the training was done and further countersigned by the HOD.

EVALUATION OF INTERNEES

- A log book shall be maintained and updated daily at the end of the day which be monitored and signed by the concerned supervisor.
- Based on the report given by the supervisor and satisfactory signature obtained in the log book, the head of the department shall issue satisfactorily completion of training.

Duration of postings

CT Scan	-	4 months
MRI	-	4 months
Ultrasound	-	3 months
Interventional Radiology	-	1 month

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UAH17CE1020	**FUNDAMENTALS OF BIOSTATISTICS**
	TotalContactPeriods–4
	Total credits -2
	Course Designed by–Department of Community Medicine
OBJECTIVES	The course will offer basic knowledge about Biostatistics and to correctly apply a variety of statistical procedures and tests according to objective of study

UNIT I: Introducing the Basics

Introduction, Graphical representation of data, Data collection, Diagrammatic and Graphical Presentation of data, Types of data, limitations.

UNIT II: Measures of Central Tendency & Dispersion

Measures of Central Tendency; Mean, Median, Mode, Geometric mean, Harmonic mean for raw data. Measures of dispersion; Quartile deviation, Mean Deviation - Standard Deviation - Coefficient of variation- Range

UNIT III: Probability

Introduction to Probability, Theorems of probability; Bayer‘s Theorem, Probability Distributions; Discrete & Continuous distributions, Binomial Distribution, Poisson Distribution, Normal Distribution.

UNIT IV: Correlation & Regression Analysis

Correlation Analysis, Types of correlation; Rank Correlation Coefficient. Regression analysis, Types of Regression, Assumptions; Comparison to Correlation.

UNIT V: Hypothesis Testing

Introduction; Types of sampling, Hypothesis testing; Type of errors, Parametric & Non-parametric tests; Mann Whitney’s U test, Chi-square, t-tests, ANOVA.

REFERENCES

1. Don. Mc Neil - Epidemiological Research Methods - Oxford University Press, London.

2. Biostatistics –Principle & Practice – McGraw Hill Education.

3. http://www.ats.ucla.edu/stat/

4. Ahttp://www.statsoft.com/textbook/basic-statistics/

COURSEOUTCOMES	
CO1	The student will be able to understand and apply the Biostatistics.
CO2	The student will be able to use the software independently for the data analysis.
CO3	The student will be able determine the correct procedures to use in a given situation
CO4	The student will be able to interpret the results of hypothesis tests

MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES

COs\Pos	**A**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**			
4	S			**S**		**M**
Category	Management					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE1021	**COMMUNICATION SKILLS FOR HEALTH CARE PROFESSIONALS**
	TotalContactPeriods–5
	Total credits -2
	Course Designed by–Department of Community Medicine
OBJECTIVES	This course deals with essential functional English aspects of the of communication skills essential for the health care professionals.

UNIT: I APPLIED GRAMMAR

Identifying common errors in sentences, Transformation of sentences, Usage of either …or…, Neither… nor…, So… that…, Such… that…, Not only… but also…, unless…

UNIT: II VOCABULARY

Abbreviations used in healthcare, Medical idioms & Phrases

UNIT: III WRITING

Letter writing, Curriculum Vitae writing, covering letter, Creative writing – invite, posters, Essay writing, summary writing, note taking, report writing.

UNIT: IV SPOKEN COMMUNICATION

Telephone etiquette, Importance of Stress, Intonation and rhythm, speaking; describing simple process, Filling a form etc., - Asking and answering questions; Debate/Oral Reporting

UNIT: V LISTENING AND READING SKILLS:

Listening and reading comprehension exercises.

Textbook Recommended:

1. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill Publishing Company Limited, New Delhi.

2. English for Colleges and Competitive Exams by Dr. R. Dyvadatham, Emerald Publishers.

COURSEOUTCOMES						
CO1	The student will be able to express better.					
CO2	The student will be able to get knowledge about MOA, adverse effects					
CO3	The student will Grow personally and professionally					
CO4	The student will Develop confidence in every field					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**b**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3	M		**S**		S	
4	S			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE1022	**BIOMEDICAL ETHICS**
	TotalContactPeriods–3
	Total credits -2
	Course Designed by–Department of Community Medicine
OBJECTIVES	To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked..

Introduction to Bioethics

Bioethical issues related to Healthcare &Medicine 5

2Anatomy - Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling 7

Physiology - Animal ethics, Health policy privacy 7

Biochemistry & Pathology - Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion 5

Pharmacology - Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics

Microbiology - Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Bio safety and bio hazard 5

Medicolegal aspects of medical records

Introduction to Intellectual Property:

Concept of Intellectual Property Kinds of Intellectual Property

Patents, Copyrights Designs, Trademarks,Geographical Indication, Infringement of IPR, Its protection and

Remedies Licensing and its types

REFERENCE BOOKS

1. Contemporary issues in bioethics – Beauchamp & walters (B&W) 4th edition.

2. Classic philosophical questions by Gloud (8th Edition)

3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008

4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748

5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,

6. Intellectual Property Right- Wattal- Oxford Publications House.(1997) ISBN:0195905024.

COURSEOUTCOMES	
CO1	The students will be able to: Recognize what constitutes an ethical concern in health care
CO2	The student will be able to understand the clinical evaluations of Disease Condition
CO3	The student will be able to Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem.
CO4	The student will get the knowledge of plagiarism in their innovations which can be questioned legally

MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**d**	**E**	**f**
1	S		M		S	S
2				s		
3			**S**			
4	S		M			**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE1023	**FUNDAMENTALS OF HUMAN GENETICS**
	Total Contact Periods– 4
	Total credits -2
	Course Designed by–Department of Genetics
OBJECTIVES	To Comprehend the Chromosomal basis of inheritance

I -Introduction to cellular components

Structure and morphology of various types of cells - Biochemical composition - Cellular organelles -Composition and components of nucleus - Chromosomes - Cell division and Mechanics of cell division and regulation.

II - Structure and functions of nucleic acids

Functions, Structure and characteristics of nucleic acids - Types of mutations -Genetic variations and polymorphisms

III - Chromosomal basis of inheritance

Chromosome behavior and inheritance pattern in man - Single gene Mendelian disorders: autosomal dominant, recessive, sex linked dominant and recessive - Polygeneic and mitochondrial inheritance.

III - Origin and detection of genetic disorders

Mutation - Non-disjunction - Chromosomal abnormalities and clinical phenotypes of common genetic syndromes (Down's syndrome, Patua‘s syndrome, Edward syndrome, Turner syndrome and Klinefelter's syndrome, Cri-du-caht syndrome)- Karyotyping, Neural tube defects, Carcinogenesis.

IV–Biochemical basis for the inborn errors of metabolism

General characteristics of inborn errors of metabolism – Incidence - etiology - Folic acid metabolism - triple markers - New born screening, prevention and management. False positive and false negative -Ethical principles of Genetic counseling for prenatal diagnosis - Fetal rights – Regulation and prevention of misuse act 1994.

Reference books

1. A guide to genetic counseling, 2nd edition, D.L. Baker, J.L. Schuette and W.R. Uhlmann, Wiley –Leiss Publications 2002.

2. Emery Elements of Medical Genetics, 9th edition, Robert F. Mueller & Ian D. young, Churchill Livingstone, 1995.

3. Medical Genetics, 3rd edition, Lynn B. Jorde, John C. Carey, Michael J. Bamshad, & Raymond L. White, Mosby, 2003.

COURSEOUTCOMES						
CO1	The student will be able to Be able to describe the chromosomal basis of inheritance and how alterations in chromosome number or structure. . .					
CO2	The student will be able to understand of the differences and similarities between diagnostic, predictive and carrier genetic testing.					
CO3	The student will be able to know detailed information of Chromosome behavior and inheritance pattern in man					
CO4	The student will be to understand the phenotype and genotype .					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**d**	**E**	**f**
1	S		M		S	
2				s		M
3			**M**			
4	S			**S**		**S**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE2024	**PRINCIPLES AND APPLICATION OF CLINICAL GENETICS**
	Total Contact Periods– 6
	Total credits -2
	Course Designed by–Department of Nephrology
OBJECTIVES	To develop awareness about Genetic testing, Genetic counseling, Philosophy and Ethos of Genetic services

I -Principle and components of genetic testing Lay out of genetic laboratories - Genetic testing, Genetic counseling, Philosophy and Ethos of Genetic services, Types of testing- Cytogenetic testing- Molecular cytogenetic testing- DNA testing.

II - Cytogenetic testing Indications, Type of sample, Sampling and transport conditions, Karyotyping - chromosome identification, merits and demerits of conventional cytogenetic testing

III - Molecular Cytogenetic testing

Indications, Type of sample, Sampling and transport conditions - Fluorescence in-situ hybridization, fluorescence signal enumeration, merits and demerits of FISH.

IV - DNA testing

Organization of human genome, Structure and function of genetic material, Polymerases chainmreaction - Types, principles and testing, Sequencing.

V - Practical:

Case studies

Reference books

1. Practical Genetic counseling, Peter S. Harper, 6th edition, Holder Headline Group 2004.

2. Medical Genetics, 3rd edition, Lynn B. Jorde, John C. Carey, Michael J. Bamshad, &

Raymond L. White, Mosby, 2006.

3. Genetics in Medicine, Thompson & Thompson, 6th edition, Elsevier 2004.

4. Practical Genetic counseling, Peter S. Harper, 6th edition, Holder Headline Group 2004.

COURSEOUTCOMES						
CO1	The student will be able to become familiar with and practice genetic tests.					
CO2	The student will be able to provide better patient care					
CO3	The student will be able to know detailed information about Genetic Counselling					
CO4	The student will be to know about Genetic testing.					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**d**	**e**	**f**
1	S		M		s	
2				s		M
3			**M**			
4	S				S	**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE2025	**CLINICAL EXAMINATION OF THE HUMANVISUAL SYSTEM**
	TotalContactPeriods–5
	Total credits -2
	Course Designed by–Department of Opthalmology
OBJECTIVES	The core objective of this course is to gain in depth knowledge on the structural and physiological functions of the various parts of the eye and the different examination procedures for the ocular structures.

: **I - History Taking**

Importance of history taking, Demographic data and its importance, Chief presenting symptoms, History of present illness, History of past illness, Family History, Common ocular symptoms and their causes – defective vision, watering eyes, discharge, redness, pain, asthenopia and other symptoms

II - Visual Acuity measurement

Distance visual acuity-charts, methods and measurements; Near visual acuity –charts, methods and measurements; contrast sensitivity testing; colour vision testing

III - External Examination

Examination of head posture, examination of forehead, examination of eye brows, examination of eyelids, examination of Lacrimal apparatus, examination of eyeball on the whole, examination of the cornea, conjunctiva sclera and anterior chamber, eye movements, muscle balance and squint evaluation

IV - Anterior segment Evaluation

Slit lamp examination of the eyelids, cornea, conjunctiva, anterior chamber depth, iris, and lens Intraocular pressure measurements using non contact tonometer

V - Posterior segment Evaluation

Introduction and importance of posterior segment evaluation- direct and indirect ophthalmoscopy

REFERENCE BOOKS:

1. Comprehensive Ophthalmology – A K Khurana, 5th edition, New Age International Publishers,

2012.

2. Clinical Ophthalmology – Jack J Kanski, 7th edition, Butterworths, 2012

1. Borish's Clinical Refraction - William J. Benjamin, Irvin M. Borish, Butterworth-Heinemann, 2006

COURSEOUTCOMES						
CO1	The student will be able to have the skill to perform basic ophthalmic examination					
CO2	The student will be able to understand concept of theory and clinical evaluation of disease conditions gain an in- depth knowledge on disease outline and clinical evaluation of patients					
CO3	The student will be able to depth knowledge on the functions of the visual system					
CO4	The student will have the skill to perform basic ophthalmic examination					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**D**	**e**	**f**
1	S		M		s	
2				S		M
3	M		**S**			
4	M			**C**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE2026	**PERSONALITY DEVELOPMENT AND STRESS MANAGEMENT**
	Total Contact Periods– 4
	Total credits -2
	Course Designed by–Department of HR
OBJECTIVES	• To Explain the effect of personality, attitudes, perceptions and attributions on Health stress, coping and relaxation.

Unit 1

Introduction to Personality Development, Different Stages of Development, Types of personalities, personality perspectives and theories

Unit 2

How needs impact personality, Maslow's hierarchy of need, Basic Personality Traits; Values, Beliefs, Interactions, Experiences, Environmental influences, the big five dimensions.

Unit 3

Stress; causes, effect and types, Stress resistant personalities, Relaxation; training aspects importance and Body works.

Unit 4

Health stress and coping, Understanding and communicating our health needs, Behavioral and psychological correlates of illness.

Unit 5

Soft skill; need and importance, Personality development and soft skills. Effective communication, listening, speaking, writing, interpretation part of soft skills and personality

Learning Outcome:

By successfully completing this course, students will be able to Describe how a personality develops.

- Define the stages of personality development.
- Define personality types.
- Describe basic personality traits.
- Personality and stress.
- Health stress, coping and relaxation.
- Soft skills and personality.

Text Books:

1. Hurlock (1976). Personality development.Tata McGraw Hill.

2. Baron R A, Psychology 5th edition, Pearsons publication.

3. Abraham A, General Psychology, Tata McGraw hill Education private limited.

Reference Books:

1. Lazarus J Stress Relief and Relaxation Techniques, Viva Book Private limited.

2. Shelly E. Taylor, Health psychology, 7th edition, TATA McGrawHil, New Delhi.

COURSEOUTCOMES	
CO1	The student will be able to Define the stages of personality development.
CO2	• The student will be able to Describe basic personality traits.
CO3	The student will be able to Describe how a personality develops-Personality and stress.
CO4	The student will be able to Develop the Soft skills and personality.

MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**D**	**e**	**f**
1	S		M		s	
2				S		M
3	M		**S**			
4	S			**S**		**M**
Category	Management					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE2027	**FIRST AID MANAGEMENT & SPLINTING TECHNIQUES**
	TotalContactPeriods–6
	Total credits -2
	Course Designed by–Department of Medicine
OBJECTIVES	Students will gain additional skills in interventional procedures and Differentiate between emergency situation and other use.

Unit-I BACKGROUND INFORMATION

- The importance of first Aid
- First aid supplies
- First aid and the law
- Prevention practices

Unit-II ACTION AT AN EMERGENCY

- Recognizing Emergencies
- Deciding to act
- Seeking medical care
- Disease transmission
- Rescuer reactions

Unit –III BLEEDING AND WOUNDS

- External bleeding
- Wound infection
- Amputations
- Impaled objects
- Wound that require medical care
- Internal Bleeding
- Dressing and Bandages

Unit-IV BONE, JOINT AND MUSCLE INJURIES

- Bone injuries
- Splinting
- Joint injuries
- RICE injuries
- Muscle injuries
- Splints – Introduction, Types, Uses, Splinting guidelines, Slings, Procedure,Complications

UNIT-V RESCUING AND MOVING INJURIES

- Water rescue
- Ice rescue
- Electrical Emergency Rescue Hazardous materials incidents

- Motor Vehicle crashes
- Fires
- Confined spaces
- Triage – what to do with multiple victims
- Moving victims

Text books:

1 .First Aid CPR and AED standard (sixth edition)

2. First aid book-St Johns Ambulance services

3. Text book of Orthopaedics – Natarajan

4. Text book of Orthopaedics – John Ebenezer Reference books: First Aid and Management of Minor Injuries by Jon Dallimore First Aid and Beyond by Dan Wolfe - Smashwords , 2014 International Trauma Life Support Provider Manual Essentials Orthpaedics Mark D Mille

COURSEOUTCOMES						
CO1	The student will be able to Differentiate between emergency situation and other use.					
CO2	The student will be able to know about the basics of concepts of disease & outlines of clinical evaluation.					
CO3	The student will be able to List management, assessment, and care steps for upper extremity and lower extremity fractures.					
CO4	The student will be to know Splinting techniques of lower extremities – Thomas splint, sam splint, etc					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**D**	**e**	**f**
1	S		M		s	
2				S		M
3	M		**S**			
4	S			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE3028	**ESSENTIALS OF MEDICAL TRANSCRIPTION**
	Total Contact Periods– 7
	Total credits -2
	Course Designed by–Department of MRD
OBJECTIVES	Provide Hands on training on English Language and listening comprehension and provide foundation to learn medical terminology & learn laboratory report

Unit 1

The Medical Transcriptionist‘s career including Ethical& Legal Responsibilities Introduction to Medical transcription, Job Opportunities, Transcription Skills, Medical records, Certification for Medical Transcriptionists, Ethical and Legal responsibilities

Unit 2

Equipments in Transcription Equipment, Computer Systems, Ergonomics, Dictation Equipments, Hand and Foot control Dictation, Transcription Preparation

Unit 3

Transcription Guidelines Punctuations, Proof reading notations, Formats and styles, SOAP for Chart notes; Discharge Summary

Unit 4 PRACTICAL:

1. Equipments for Medical Transcription,2. Typing for the beginners, 3.Vocabulary, 4. Proof reading Notations , 5. Formats and styles in document preparation , 6. Preparation of chart notes, 7. Listening Comprehension, 8. Transcription check off sheet **References Book**1. Medical Key boarding, Typing, and Transcribing Techniques and procedures 4th Edition, March

Otis Diehl, Marilyn Takahashi Fordney, W.B. Saunders Company

2. The AAMT Book of Style for Medical Transcription, Claudia J. Tessier

3. CD‘s available for:

a. Stedman‘s Electronic Medical Dictionary 4.0

b. American Drug Index 2003

Text Books:

1. Medical Key boarding, Typing, and Transcribing Techniques and procedures 4th Edition, March

Otis Diehl, Marilyn Takahashi Fordney, W.B. Saunders Company

2. The AAMT Book of Style for Medical Transcription, Claudia J. Tessie

COURSEOUTCOMES						
CO1	The student will be able to Demonstrate their basic skills in the knowledge of Vocabulary, Medical terminology					
CO2	The student will be able to Demonstrate their basic skills in the preparation of chart notes. .					
CO3	The student will be able to Demonstrate skills in listening comprehension					
CO4	• The student will be be able to identify accurate format for medical document preparation					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**d**	**E**	**f**
1	S		M		S	
2				s		M
3	M		**S**			
4	S			**S**		**M**
Category	Medical Records					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE3029	**COMMUNICATION AND SOFT SKILL**
	Total Contact Periods– 7
	Total credits -2
	Course Designed by–Department of Human Resources
OBJECTIVES	This course is designed to equip the students with essential soft skills needed for workplace and improve personality.

LEARNING OUTCOME:

This course is designed to help the students to

- Foster healthy attitude.
- Develop effective inter and intra personal skills to be an effective team worker.
- Communicate effectively in both academic and professional setup

UNIT: I ASPECTS OF COMMUNICATION

Importance of communication, Process, Barriers, Non verbal Communication

UNIT: II SPEAKING

How to Open and Close conversations, Introductions and Address System, Expressing Courtesy, Giving Compliments and replying to Compliments, Presentation Skills, Telephonic conversation and telephone etiquette

UNIT – III PRESCRIBED READING

Tom Sawyer by Mark Twain, Bacon‘s Essays: - Of Goodness and goodness of nature

UNIT – IV WRITING

Letter writing - Letter of Complaints, Inviting and Declining an invitation, Writing Memos and Emails, Grammar, Spelling & Punctuation, Use of Dictionary & Thesaurus.

UNIT – V SOFT SKILLS

Active Listening Skills, Assertive Skills, Negotiation and Persuasive Skills, Interview Skills

Text Book:

Developing Communication Skills by Krishna Mohan and Meera Banerji, II edition, Macmillan.

Reference Books:

1. Communication Skills for Engineers and Scientists by Sangeeta Sharma and Binod Mishra, PHI Learning Private Limited, New Delhi.

2. English and soft skills by S.P. Dhanavel, Orient Black Swan

3. Effective English Communication by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill Publishing Company Limited.

4. Technical Communication – Principles and Practice, by Meenakshi Raman and Sangeetha Sharma, II edition, Oxford University Press.

5. Developing Communication Skills by Krishna Mohan and MeeraBanerji, II edition, Macmillan.

6. The Complete Guide to Functional Writing in English by M. Sarada, Sterling Publishers (P) Ltd., New Delhi.

7. Speaking Naturally: Communication Skills in American English by Bruce Tillitt and Mary Newton Bruder, Cambridge University

COURSEOUTCOMES	
CO1	The student will be able to Foster healthy attitude
CO2	The student will be able to develop effective inter and intra personal skills to be an effective team worker
CO3	The student will be able to Develop effective inter and intra personal skills to be an effective team worker
CO4	The student will be able to Communicate effectively in both academic and professional setup

MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**a**	**B**	**C**	**d**	**e**	**F**
1	S		M		s	
2				s		M
3	M		**S**			
4	s			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					

UAH17CE3030	**PROFESSIONAL SKILLS DEVELOPMENT**
	Total Contact Periods– 6
	Total credits -2
	Course Designed by–Department of Human Resources
OBJECTIVES	To Advance the students' intellectual curiosity, competency and skills in preparation for employment

1. Communication Skills

Importance of Communication skills in Public health; Communication process; Methods of communication; Types of communication: Verbal and Non-verbal; Impediments to effective communication; Feedback

2. Oral Presentation Skills:

Preparation and planning; Structure; Audio-visual aids; Creating interest and establishing a relationship with the audience; Body language; Voice and pronunciation; Review

3. Writing skills:

Writing a scientific paper; Writing a proposal; Structure of an article; References and literature review; Peer-review process-Publication bias; International guidelines for publication in journals; Professional Ethics

4. Leadership in Public health:

Leadership styles and trait; Motivation skills; Interpersonal communication skills; Problem solving skills; Decision making skills; Management skills; Communication Skills

5. Manuscript writing

Writing introduction, objectives, methodologies, major finding, discussion, conclusion and recommendation**6. Seminar presentations**Use of computers present data and information on recent topics

Text Books:

1. Professional Writing Skills, A self paced training programme by Janis Fisher Chan and Diane Lutovich. Advanced Communication Designs Inc, 2003. San Anselmo, CA. ISBN 0963745549

2. Speaking Your Mind: Oral Presentation and Seminar Skills By Rebecca Stott, Tory Young, Cordelia Bryan Contributor Rebecca Stott, Tory Young, Cordelia Bryan Published by Longman, 2001 ISBN 0582382432, 9780582382435

3. Public Health Leadership: Putting Principles into Practice Louis Rowitz, PhD. Jones and Bartlett Publishers, 2003. ISBN-13: 9780763725013 ISBN-10: 07637250

COURSEOUTCOMES						
CO1	The student will be able to Develop good written and oral communication abilities					
CO2	The student will be able to Develop an understanding of team building and leadership skills.					
CO3	The student will be able to Develop knowledge regarding capacities needed to work independently within diverse work environments					
CO4	The student will be able to know how to maintain Records and Reports and demonstrate the procedure.					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**D**	**e**	**f**
1	S		M		s	
2				S		M
3	M		**S**			
4	S			**S**		**M**
Category	Basic Medical Science					
Approval	46th Meeting Of Academic Council held in Aug, 2017					

UAH17CE3031	**LIBRARY SCIENCE AND E-RESOURCES**
	Total Contact Periods– 6
	Total credits -2
	Course Designed by–Department of Library science
OBJECTIVES	To gain knowledge about Documentary Sources of Information and Library Automation

Unit 1 BASIC CONCEPTS AND INFORMATION SERVICES

Meaning of Library – Types of Library -– Library layout - Functions of Library – need for Library – Meaning of ISBN and ISSN – Collection management - Library Classification system - Five laws of Library Science – Inter Library Loan (ILL), Communication theories and models.Barriers to communication.Levels of communications – Intrapersonal, interpersonal and mass communication. Information services – literature search Methods of Dissemination of information Current Awareness Service (CAS), Selective Dissemination of Information (SDI), Document delivery service, Alert services, and Internet services.

Unit 2 INFORMATION SOURCES

Documentary Sources of Information, Print, and Non-print including Electronic, Human and Institutional sources: Nature, types, characteristics and utility. Internet as a source of Information. Primary sources of information – Journal, conference volume, patents, research reports, thesis and their electronic format – Secondary sources of information - Bibliography, Encyclopedia Dictionary, Yearbook , Directory, Geographical Source, Textbook, Index and Abstracts.

Unit 3 LIBRARY AUTOMATION

Definition need, Purpose, advantages. Planning for Library automation. Automation of Library operations - Acquisitions, Cataloguing, OPAC, Circulation and Serials control. Evaluation of Library automation systems - Application of Barcode and RFID Technology for Library Functions. Basic concepts: Bibliography, bibliographic coupling, Impact factor.

Unit 4 ELECTRONIC INFORMATION SOURCES

Electronic Information resources: Meaning and definition, Growth and development, Types. Journals, e-Books, e-Theses, e-newspapers, Blogs, Wikis. Free databases and fee based bibliographical and full text databases, subject related websites, Institutional repositories, Open Archives and digital Libraries. - Resource Sharing and Networks: Consortia- Importance and objectives. Study of Information networks and Digital Library Consortia. Types of computer networks: Local Area Networks – Concept, Topologies - Bus, Star, Mesh, Tree, and Ring). Wide Area Networks and Metropolitan Area Networks- Concepts, Circuit switching and Packet switching. Difference between LAN and WAN. Wireless Networks –Mobile telephones.

Unit 5 DIGITAL LIBRARIES

Digital Libraries: Concepts and issues. Understanding digital Libraries Content creation – Electronic documents, files and file formats. Study of different file formats.Studying PDF in detail-features of PDF.Digitization- scanning, Digital Preservation, Conservation and Archival Management – Problems and prospects. Open Access Movement and Institutional repositories.

TEXTBOOKS

1. Ranganathan, S.R The five Laws of Library Science UBS Publishers, 1988.

2. Ranganathan, S.R. Library Manual SaradaRanganathan endowment for Library Science, 1989.

3. Ranganathan, S.R. Cataloguing Practice SaradaRanganathan endowment for Library Science 1990

COURSEOUTCOMES						
CO1	The student will be able to analyze and understand the query					
CO2	The student will be able to Identify the sources of information					
CO3	The student will be able to Find out the information					
CO4	The student will be able to know how to maintain Records and Reports and demonstrate the procedure.					
MAPPINGBETWEENCOURSEOUTCOMES&PROGRAMMEOUTCOMES						
COs\Pos	**A**	**B**	**c**	**d**	**e**	**F**
1	S		M		s	
2				s		M
3	M		**S**			
4	S			**S**		**M**
Category	Library Science					
Approval	46th Meeting of Academic Council held in Aug, 2017					