CERTIFICATE IN RADIO IMAGING TECHNOLOGY

DURATION :- 1 YEARS ELIGIBILITY :- 10TH

1ST YEAR

CODE	SUBJECT	MAX MARKS	CREDIT
101	HUMAN ANATOMY	100	4
102	HUMAN PHYSIOLOGY	100	4
103	GENERAL BIOCHEMISTRY	100	4
104	ENGLISH COMMUNICATION & SOFT SKILLS	100	3
105	FUNDAMENTAL OF MEDICAL IMAGING & RADIOTHERAPY	100	4
106	COMPUTER FUNDAMENTALS	100	3
107	PRACTICAL –I	100	3
108	CLINICAL POSTING	100	2

101 HUMAN ANATOMY

Unit -1
Terminology and General Plan of the Body, Body Parts and Areas,
Terms of Location and Position, Body Cavities and Their Membranes, Dorsal cavity, Ventral cavity, Planes and Sections
Unit –II
Cells: Structure, function and location, Prokaryotic and eukaryotic cells, Cell organelles, Cell division
Tissue, Types, Structure, Location and Function of Epithelial Tissue, Connective Tissue, Muscle Tissue, Nerve Tissue, Membranes, Glandular tissue
The Integumentary System: structure and function of The Skin, Subcutaneous Tissue
Unit-III
Musculoskeletal System: Basic anatomy of important muscles and bones
Unit-IV
Respiratory system: Basic anatomy of nose, larynx, trachea, bronchi and lungs
Unit – V
Digestive system: basic anatomy of oesophagus, stomach, small intestine, large intestine, liver, gall bladder, pancreas

102 HUMAN PHYSIOLOGY

Unit-I
Cell physiology: Structure, membrane, transport across cell membrane, Active, Passive, Organization of the Body, Body Composition, Body Fluid Volumes and its measurement, Diffusion, Osmosis, Tonicity, Homeostasis
Unit-II
Blood-composition, function, cellular component & their function, haemoglobin & anaemia, blood groups and coagulation
Lymphatic system-Composition & function of lymph, lymphatic tissue, Immunity with the role of

thymus
Unit-III
Cardiovascular system-general arrange, heart, arteries, veins and capillaries, heart structure and function, cardiac cycle, heart sounds, heart rate, blood pressure, mechanism of circulation, definition of hypertension & shock
Unit-IV
Respiratory system: parts of respiratory system, mechanism of respiration, pulmonary function, pulmonary circulation, lungs volume, Gas transport between lungs and tissues,
Definition of hypoxia, dyspnoea, cyanosis, asphyxia and obstructive airways diseases
Unit- V
Gastrointestinal physiology: Organs of GIT and their structure & function, secretion, digestion, absorption and assimilation, gastrointestinal hormones, physiology of digestion of carbohydrates, proteins & lipids, Structure & function of liver, spleen, gall bladder & pancreas, Jaundice, Cirrhosis & Pancreatitis

103 GENERAL BIOCHEMISTRY

Unit-I
Introduction to Clinical Biochemistry and role of Medical Lab Technologist , ethics, responsibility, safety measure and hazards in clinical biochemistry lab and first aid in laboratory accidents.
Glassware's & plastic ware's used in lab, calibration of volumetric apparatus, cleaning& care and maintenance
Unit II
Principle, working, care & maintenance and calibration of Weighing balance, Hotplate, Magnetic stirrer, Centrifuges, Incubator, Hot air oven, Colorimeter, Spectrophotometer, Water distillation plant, Deionizers Henderson Hassel balch equation, pH paper, pH meter, method of pH measurement,
Unit-III
Preparation of solution and reagents, normal solution, molar solutions, percent solution, buffer solution, dilutions, w/v, v/v, standard solution, aqueous solutions, concepts of acid and base
Units of measurement: SI unit, reference range, conversion factor, units for measurement of bio metabolite, enzymes, protein, drugs, hormones, vitamins
Unit-IV
Specimen collection and processing of blood, urine & CSF, separation of serum and plasma, deproteinization of sample, Handling of specimens for testing, preservation of specimen, transport of specimen, factors affecting the clinical results, effect of storage on sample
Unit- V
Physical, chemical and microscopic examination of urine, Bence Jones Proteinuria and its clinical significance, qualitative test of urine for reducing sugars, protein, ketone bodies, bile Salt, bile pigments, urobilinogen, occult blood, uric acid, urea and Creatinine, quantitative estimation of 24 hrs urine for protein and their clinical significance.

104 ENGLISH COMMUNICATION & SOFT SKILLS

UNIT-I: Introduction to English language
a) Role and significance of English language in the present scenario
b) English Language: Its relevance for the Indian industry
c) Introduction to Listening, Speaking, Reading, Writing (LSRW) and benchmarking of the class
UNIT-II: Phonetics& Functional Grammar
a) Pronunciation and daily usage correction (speak with differences between p/b, s/sh, f/ph, t/d, v/w sounds)
b) Parts of speech, articles, tenses, verbs and modals
c) Practice of daily use words, numerals and tongue twisters
d) Vocabulary building, Construction of simple sentences: Basic sentence pattern, subject and Predicate

[Note: As part of classroom activity, language games, tongue & jaw exercises, simple passages from the newspapers for oral drills in the classroom and practice tests (written and oral)]
UNIT-III: English Communication- About Myself
a) Let's talk, making conversation, meeting and greeting
b) Introducing myself, my family and my friends
c) My opinions, my likes and dislikes
d) Life at college, hostel and workplace
[Note: As part of classroom activity, use the Workbook for reference for classroom and home assignments, carry out practice tests (written and oral)]
UNIT-IV: Personality Development
a) First impression: Dressing sense, good manners, speaking well and respectably
b) Positive Attitude: Being happy and alert, a good listener and a good friend
c) Consultation among peers: Soliciting advice and giving advice
d) Goal setting, confidence building& handling rejection
[Note: As part of classroom activity, refer Workbook for classroom and home assignments, carry out practice tests (written and oral)]

105 FUNDAMENTAL OF MEDICAL IMAGING & RADIOTHERAPY

The X-Ray machine
1. X-ray Production, Emission & Interactions with Matter
2. Radiographic Film, latent Image, Intensifying Screens, Grids
3. Radiographic Exposure, Film Developing & Processing, Radiographic Quality
4. Physical Principles of Diagnostic Ultrasound Plezoelectric Effect.
5. Acoustic Intensity, Reflection, Impedance & Absorption
6. Ultra Sound Transducer, Beam, Operational Modes & Biological Effects.
7. Compound Tomography Principles of Operation System Components & Image Reconstruction.
8. Physical Principles of Magnetic Resonance Imaging: Basic concept, System Components, Biological Hazards, Advantage over CT

106 COMPUTER FUNDAMENTALS

Unit-I
Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
Processor and memory: The Central Processing Unit (CPU), main memory. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
Unit-II
Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
Unit-III
Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

Unit-IV
Introduction of Operating System: introduction, operating system concepts, types of operating system, Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
Electronic Payment Systems: Introduction, Types of Electronic Payment Systems, Digital Token-Based, Electronic Payment Systems, Smart Card and Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk and Electronic Payment Systems.
Unit-V
Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

107 PRACTICAL-I

Practical Human Anatomy
1. Demonstration of Major organs through models and permanent slides.
2. Demonstration of parts of circulatory system from models.
3. Demonstration of parts of respiratory system from models.
4. Demonstration of digestive system from models.
5. Demonstration of excretory system from models.
6. Demonstration of nervous system from models.
7. Structure of eye and ear
8. Demonstration of structural differences between skeletal, smooth and cardiac muscles.
9. Demonstration of various bones
10. Demonstration of various joints
11. Demonstration of various parts of male & female reproductive system from models

Practical Human Physiology
1. To measure pulse rate
2. To measure blood pressure
3. Demonstration of ECG
4. To perform Hemoglobin by Sahli's Method
5. To perform Hemoglobin by CMG method.
6. Haemoglobin by CMG method.
7. To perform Total RBC count.
8. To perform total leucocyte count.
9. To perform differential leucocyte count.
10. To perform PCV

Practical Fundamental of Medical Imaging & Radiotherapy
1. X-ray tubes general features and mobile equipments.
2. Care and maintenance of X-ray equipments and image intensifier
3. To study effects of Kilo Voltage Peak (KVP) and Milli Ampere Second (MAS)
4. T o check the safety of dark room.
5. To check the speed of intensifying screen.
6. To check the developing time test and function.
7. Silver recovery method

Practical Fundamentals of Biochemistry
1. To study general laboratory safety rules.
2. To demonstrate glasswares,apparatus and plasticwares used in laboratory.
3. Collection of blood sample
4. To separate serum and plasma.
5. Preparation of different percentage solutions
6. Preparation of normal and molar solutions.(0.1 N NaOH, 0.2N HCl,0.1 M H_2SO_4)

7. Demonstration of photocolorimeter
8. Demonstration of spectrophotometer
9. Demonstration of pH meter
10. Deproteinization of blood sample

Practical: Basics of Computer

Computer fundamental and internet lab

1. Using basic DOS commands.
2. Using external DOS commands
3. Creating a email account
4. Using web browser for searching and surfing.
5. Creating and formatting a document in MS office
6. Using autocorrect, auto text and spell check operation in MS office .
7. Create tables in MS Word.
8. Inserting different kinds of object in MS word.
9. Use main merge options in MS office.
10. Create a Excel work sheet with following options rows and columns alignment..
11. Using excel formulas.
12. Create a graph with available data in MS excel.
13. Create a PPT presentation using auto content wizard.
14. Use Clip art animation effects and word art galleries in presentations.
15. Using transition and setting timings for slide show.
16. Use MS access to create data base and tables.

108 CLINICAL POSTING

Students shall be deputed to various labs of Radiology department wherein they shall undergo practical training of handling patients, collection and processing of investigation (X Ray, Special procedures, CT Scan, MRI, Ultrasound etc) and equipment.

Identification of patient's particulars based on CR number, Lab Number and transfer of samples from collection to different labs.

Process of performing various tests in different labs

Each student is required to maintain a logbook of the various posting. Student's performance shall be evaluated on continuous basis by the faculty posted in various sections. The faculty shall submit the assessment records of each student posted in his/her section on monthly basis to the HOD. Marks will be awarded out of 100.