GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM | HYDERABAD | BENGALURU

Accredited by NAAC with A^+ Grade

Regulations and Syllabusof

UPMED03: B.SC. RADIOLOGY AND IMAGING TECHNOLOGY

(w.e.f. 2022-23 admitted batch)

B. Sc. RADIOLOGY AND IMAGING TECHNOLOGY

(with effect from 2022-23 Admitted Batch)

1.0 ADMISSIONS

Admissions into B.Sc. Paramedical (Specialization in Radiology and Imaging Technology) program of GITAM (Deemed to be University) are governed by GITAM (Deemed to be University)admission regulations.

2.0 ELIGIBILITY CRITERIA

Eligibility:

Qualified in Intermediate or 10+2 equivalent examinations with 60% Aggregate marks in Physics, Chemistry, Biology and English or APOSS (Open school intermediate) with GPA or equivalent.

About the course:

Our popular Medical Science program B. Sc. Radiology and Imaging Technology lasts for 3 years and prepares students to diagnose and treat various illnesses and disorders utilizing X-rays. The candidate should have a sharp eye for detail, excellent research abilities, the ability to analyse technical data, and the ability to utilize radiography equipment with the highest accuracy if they want to develop a successful career in radiology and radiography and candidates may become ready for that by doing a B. Sc. Radiology and Imaging Technology programme.

Course Administration

The course is delivered in 6 semesters with each semester dealing with prescribed subjects.

- All subjects are mandatory for the student. The student is trained in both theory and practical/clinical aspects of the course. Student is assessed by formative and summative assessment every semester.
- There will be one internal exam before the semester-end exam. Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- A candidate shall be declared to have passed in the concerned subject, if he fulfils the following criteria
    - He / She secured 35% marks in the internal assessment and
    - (a) He / She secured 40% marks in theory and
      (b) 50% marks in practicals & viva and

(c) 50% marks in theory, practical &viva put together in each subject separately. Course objectives and learning outcomes are specified leading to clarity on what a student would be able to do at the end of the program.

STRUCTURE OF THE PROGRAM

The Program consists of

i. Foundation Course (FC)
ii. Core Courses - Compulsory (C)
iii. Discipline Specific Electives (DSE)
iv. Generic Electives (GE)
v. Internship/ Project/ Training (Detailed Report to be submitted in the prescribed format)

Each academic year consists of two semesters. The curriculum structure of the BSc Paramedical program and the contents for various courses offered are recommended by the Board of Studies concerned and approved by the Academic Council.

MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English. The method of instruction shall comprise classroom lectures, guest lectures, demonstrations, presentations, role-play, group discussions, seminars, class tests, case analysis, situational analysis, practical training etc.

ATTENDANCE REQUIREMENTS

- A candidate must have not less than 75% attendance in theory and 80% in practicals separately.
- Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- There will be one internal exam before the semester-end exam.
- Internal marks will be considered for eligibility for the semester exam but will not be added for the semester exam.

EVALUATION:

CONTINUOUS ASSESSMENT AND EXAMINATIONS

- There will be one internal exam before the semester-end exam.
- Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- Internal marks will be considered for eligibility for the semester exam but will not be added for the semester exam.

EXAMINATION DURATION AND PATTERN

a. Anatomy, Biochemistry & Physiology, Microbiology, Pathology, Pharmacology, General Medicine, General Surgery & Parent Department-

100 marks each

60 marks theory

40 marks Practical (3 0 marks + viva 10marks)

(Community Medicine, English, Psychology, EVS, Computer carries 40 marks each (No Practicals, only Theory). Community Medicine (third & Fourth Semester will be for 50 Marks – 30 Marks Theory & 20 Marks Practicals)

b. Pattern of question paper

c. 60 marks paper Duration: 2 ½ Hours
1 Q Essay (1x 10m = 10 marks)
2 Q to 5 Q Short notes (total 4 Q, 4 x 5 m = 20 marks)
6 Q to 15 Q very short notes (total 10 Q, 10 x 3m = 30marks)

d. 40 marks paper Duration: 2 hours
1 Q Essay question (1 x10 m = 10 marks)
2 Q to 4 Q - Short notes (3 Q x 5 = 15marks)
5 Q to 9 Q - Very short notes (5 Q x 3 m = 15marks)

e. 30 Marks Paper Duration: 1 ½ Hours
1 Q Essay (1x 10m = 10 marks)
2 Q to 3 Q Short notes (total 2 Q x 5 m = 10 marks)
4 Q to 8 Q very short notes (total 5 Q x 2m = 10marks)

Criteria for the following subjects have exam at the college level only:

- Soft skills, First aid, Biotechnology and medical Physics, Patient Care. These subjects are included in the semester exam and the candidates shall be declared as passed only when they secure 35% marks in the internal exam.
  - Community Medicine:

- The theory exam to be conducted in 3rd & 4th –semester, theory along with practicalsin the 3rd& 4th semester.
    - Paper Setting:
- Paper setting, paper valuation and practical examination is done by internal examiners from the 1st to 5th semesters.
- In the 6 th semester paper setting will be done by concerned subject experts. Paper valuation and practical examination will be conducted but 2 examiners – one internal and one external examiner.
    - Criteria for Examiner:
- Professor or Associate Professor or Assistant Professor with minimum of 4 years of teaching experience after post-graduation.
- Parent Department Subjects semester exams will be conducted from the 3rd semester onwards.
- Subjects for 1st semester exam
    - Anatomy
    - Physiology
    - Biochemistry
    - EVS
    - English
    - Psychology
    - Computers

2nd Semester Exam

Anatomy

Physiology

Biotechnology & medical physics

Grace Marks: Maximum 5 marks can be awarded to one subject provided he passed all the other subjects or these 5 marks can be split for maximum 2 subjects. Provided the candidate has passed rest of the subjects.

- Qualifying marks to pass the semester exam.
- A candidate shall be declared to have passed the examination if.
    - He / She secured 35% marks in the internal assessment.
    - Anatomy, Physiology & Biochemistry (a) He / She secured 40% marks in theory. (b) 50% marks in practicals & viva (c) 50% marks in theory, practical &viva put together in each subject separately.
    - For Community Medicine, EVS, English, Psychology, computer He/ She should secure minimum 50% marks in theory.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To impart knowledge and skill in accordance with the requirement in basic medical sciences and paramedical specialty as relevant
PEO 2	To impart training required to carry out necessary investigative procedures accurately to facilitate proper diagnosis and prognosis of diseases
PEO 3	To train the student to perform routine as well as special investigative procedures in the concerned paramedical specialty
PEO 4	To impart knowledge and practical training required to operate and maintain all equipment used in the concerned specialization
PEO 5	To impart knowledge about communication skills, basic research skills, professionalism, and ethical aspects required in various health care settings for effective delivery of health care

PROGRAMME OUTCOMES (POs)

PO1	To prepare a cadre of healthcare technologists who can effectively assist senior health professionals in the delivery of quality health services.
PO2	To prepare skilled paramedical human resources for all levels of the healthcare delivery system from primary to tertiary care level.
PO3	To train the students to carry out necessary procedures accurately and to facilitate proper diagnosis and prognosis of diseases.
PO4	To enable to perform routine as well as special investigative procedures in the concerned paramedical specialty.
PO5	To develop knowledge and skill in accordance with the demand in the field of paramedical specialty as applicable.
PO6	To enable to operate and maintain all types of equipment used in the concerned specialization.
PO7	To make capable to support advanced testing activities and Research.
PO8	To enable to work as Supervisor/Trainer/Teacher in the field of Paramedical sciences.
PO9	To enable to communicate and interact effectively with non-clinical and clinical persons in various healthcare environments
PO10	To be able to present oneself in an ethical and professional manner
PO11	To equip the paramedical staff with modern skills and knowledge to bring them at par with other national and international standards
PO12	Students who complete these programs will be able to work in both an individual and team environment

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the end of course the student will be able to:

PSO1	To be able to demonstrate quality patient care skills including professionalism, patient consent and ethical behaviors as specified in the code of ethics.
PSO2	To be able to undertake X-RA, Mammography, CT scan and MRI procedures independently.

PSO3	Assist in specialized radiological procedures.
PSO4	To be able to do the image processing and evaluation for technical quality.
PSO5	To be able to handle, take care and maintenance of all radiological and imaging equipment independently.
PSO6	Should ensure radiation protection and quality assurance.
PSO7	Able to identify and manage emergency situations.
PSO8	Able to receive and document verbal, written and electronic orders in the patient's medical record.

STRUCTURE OF THE PROGRAMME

Semester-wise StructureSEMESTER-I

S. No.	Course Code	Course Title	Course Category
1	ANAT1001	ANATOMY - I	**C**
2	BCHE1001	BIOCHEMISTRY - I	**C**
3	PSGY1001	PHYSIOLOGY - I	**C**
4	LANG1141	ENGLISH	**FC**
5	PSYC1031	PSYCHOLOGY	**FC**
6	CSCI1301	COMPUTER BASICS	**FC**
7	ENVS1051	ENVIRONMENTAL SCIENCE	**FC**

SEMESTER-II

S. No	Course Code	Course Title	Course Category
1	ANAT1011	ANATOMY - II	**C**
2	PSGY1011	PHYSIOLOGY - II	**C**
3	BTSC1041	BIOTECHNOLOGY & MEDICAL PHYSICS (Only Internal exam, no university exam)	**FC**

SEMESTER-III

S. No	Course Code	Course Title	Course Category
1	PHCG2001	PHARMACOLOGY - I	**C**
2	MIBG2001	MICROBIOLOGY - I	**C**
3	PATH2001	PATHOLOGY - I	**C**
4	CMED2001	COMMUNITY MEDICINE & SOFT SKILLS	**C**
5	NURS2001	BASICS OF PATIENT CARE (No Uni. Exam)	**FC**
6	RADG2001	RADIOLOGY & IMAGING TECHNOLOGY - I	**C**

SEMESTER: IV

S. No	Course Code	Course Title	Course Category
1	PHCG2011	PHARMACOLOGY - II	**C**
2	MIBG2011	MICROBIOLOGY - II	**C**
3	PATH2011	PATHOLOGY - II	**C**
4	CMED2011	COMMUNITY MEDICINE	**C**
5	RADG2011	RADIOLOGY & IMAGING TECHNOLOGY - II	**C**

SEMESTER: V

S. No.	Course Code	Course Title	Course Category
1	GMED3001	GENERAL MEDICINE - I	**C**
2	GSUR3001	GENERAL SURGERY-I	**C**
3	RADG3001	RADIOLOGY & IMAGING TECHNOLOGY - III	**C**
4	RADG3011	RADIOLOGY & IMAGING TECHNOLOGY - IV	**C**

SEMESTER-VI

S. No	Course Code	Course Title	Course Category
1.	RADG3023	RADIOLOGY & IMAGING TECHNOLOGY - V	**C**
2.	RADG3031	RADIOLOGY & IMAGING TECHNOLOGY - VI	**C**
3.	RADG3041	RADIOLOGY & IMAGING TECHNOLOGY - VII	**C**

Syllabus:

SEMESTER - I

S. No	Course Code	Course Title	Course Category
1	ANAT1001	ANATOMY - I	C
2	BCHE1001	BIOCHEMISTRY - I	C
3	PSGY1001	PHYSIOLOGY - I	C
4	LANG1141	ENGLISH	F C
5	PSYC1031	PSYCHOLOGY	F C
6	CSCI1301	COMPUTER BASICS	F C
7	ENVS1051	ENVIRONMENTAL SCIENCE	F C

ANAT1001: ANATOMY-I

Semester-I

(with effect from 2022-23 admitted batch)

INTRODUCTION:

Anatomy deals with the structural organization of the human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture into the clinical domain. The department of anatomy is committed to providing quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides, and VARIOUS models provide the ideal environment to learn anatomy during the 1st year of their course.

COURSE OBJECTIVES:

- The objective of this subject is to provide an outline of anatomy to improve the students understanding of the technical and diagnostic procedures used, with special emphasis on applied aspects.

SYLLABUS

LEARNING OUTCOMES:

After completion of the course at the end of 1st year, the first semester, the student must be able to know the following:

a. Introduction of Anatomy & Cell, Tissues

1. Anatomical terminology

2. Name the cell organelles

3. Types of Cell divisions

4. Classification of bones

5. Parts of long bone

6. Blood supply of long bone.

7. Classification of muscles

8. Cardiac muscle.

b. Introduction to Histology & lungs

1. Classify of Epithelium.

2. Type of Cartilages.

3.. Histology of bone

4. Different Parts of the Pleura.

5. Describe The Surfaces, Borders And The Mediastinal Surface Of The Lungs.

6. Relations of right lung

7. Relations of left lung

8. Bronchopulmary segment of lung

9. Costo diaphragmatic recess

10. Hilum of lung

11. Histology of lung

c. Heart & Blood vessels

1. Describe the external feature of heart with a labelled diagram

2. Mention the openings of right atrium

3. Briefly on Internal features of heart

4. Types of circulation

5. Aorta & its branches

6. Coronary circulation

7. Chambers of the heart &its vessels

8. Papillary muscles

d. Limbs

1. Bones of Upper limb

2. Carpal bones

3. Name the muscles of Upper limb

4. Bones of Lower Limb

5. Tarsal bones

6. Median cubical vein

7. Name of nerves of lower limb

8. Name of the nerves of upper limb

9. Mention the arteries of upper limb

10. Mention the arteries of lower limb

11Name the muscles and nerve of back of thigh

12. Deltoid muscle

13. Gluteus maximum

COURSE OUTCOMES:

- Explains knowledge on the basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides a foundation in completion of the course.
- Explain the anatomy and functions of various Tissues and cells, an organization of a cellular system.
- Understand the functioning of lungs, heart, and blood vessels.

References:

1. BD Chaurasia : Handbook of general anatomy
2. Textbook of Anatomy & Physiology by InduKhurana&Arushi
3. Textbook of Anatomy & Physiology by PR Ashalatha& G Deepa
4. Textbook of Anatomy & Physiology by Ashalatha N Nandedkar, Vijay D Joshi &Sadhana – 3rd edition

BCHE1001: BIOCHEMISTRY-I
Semester-I
(with effect from 2022-23 admitted batch)

Introduction:

Biochemistry deals with the structures, bonding, functions, and interactions of biological macromolecules, such as proteins, nucleic acids, carbohydrates, and lipids. They provide the structure of cells and perform many of the functions associated with life. Biochemistry focuses on understanding the chemical basis which allows biological molecules to give rise to the processes that occur within living cells and between cells, in turn relating greatly to the understanding of tissues and organs, as well as organism structure and function.

Course Objectives:

- Students must understand the basic principles of Biochemistry and the biochemical processes that take place in the human body and their applied aspects.

Syllabus: **THEORY – 40HRS** **PRACTICAL -20HRS**

CONTENT	
Cell biology	1. Recall the structure and functions of the cell and cell membrane. 2. Explain various types of absorptions 3. List intracellular organelles and mention their functions 4. Explain cytoskeleton
Carbohydrate Chemistry	1. Define carbohydrates, classify carbohydrates with examples, explain glycosidic bond 2. Illustrate structure, composition, sources, properties and functions of monosaccharides, disaccharides, oligosaccharides, and polysaccharides. 3. Explain glycosaminoglycan (mucopolysaccharides)
Lipid Chemistry	1. Define and classify lipids 2. Define, classify and list properties & functions of Fatty acids, Triacylglycerol, Phospholipids, cholesterol 3. Elaborate essential fatty acids and their importance 4. Explain Lipoproteins: definition, classification, properties, sources and function and ketone bodies
Amino -acid Chemistry	1. Define and classify amino acids 2. Define peptides and explain peptide bonds, list the biologically important peptides. 3. Define and classify proteins, enumerate functions of proteins.
Enzymes	1. Define and classify with examples, active site, cofactor, proenzyme 2. List the factors affecting enzyme activity 3. Define enzyme inhibition and talk about its significance 4. Define isoenzymes, enzymology (clinical significance of enzymes)
Nucleotide and Nucleic acid chemistry	1. Show nucleotide composition and list functions of free nucleotides in body 2. Compare between DNA & RNA, explain structure and functions of DNA & RNA (tRNA, rRNA, mRNA)
Carbohydrate Metabolism	1. Illustrate glycolysis-aerobic, anaerobic, citric acid cycle, substrate phosphorylation 2. Elaborate glycogen metabolism -glycogenesis, glycogenolysis, metabolic disorders of glycogen, gluconeogenesis, Cori cycle

	3. Summarize hormonal regulation of glucose, glycosuria, diabetes mellitus
Lipid Metabolism	1. Explain lipid metabolism-lipolysis, oxidation of fatty acids 2. Explain lipogenesis- Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues 3. Elaborate ketone body metabolism: formation(ketogenesis), utilization(ketolysis), ketosis, Rothera's test 4. Summarize cholesterol metabolism: synthesis, degradation, cholesterol transport 5. Define Hypercholesterolemia, list its effects, causing agents common hyperlipoproteinemia 6. Explain about fatty liver
Amino acid and protein metabolism	1. Define Catabolism of amino acids- transamination, deamination 2. Illustrate fate of ammonia, transport of ammonia, Urea cycle 3. Outline the specialized products formed from amino acids
Vitamins	1. Define vitamins and classify them according to solubility 2. List the sources, Coenzyme forms, functions, Recommended Dietary Allowance (RDA) 3. Tell about digestion, absorption and transport, deficiency and toxicity of individual vitamins
Mineral metabolism	1. Define minerals and list the sources for mineral and their Recommended Dietary Allowance 2. Tell about digestion, absorption, transport, excretion of various minerals 3. List the functions and disorders of individual minerals – Calcium, phosphate, iron, magnesium, fluoride, selenium, molybdenum, copper
Acid-base balance	1. Define acids, base and pH 2. Define buffers and describe buffer systems of the body (bicarbonate buffer system) 3. Elaborate about the role of lungs and kidneys in acid-base balance. 4. Acid base disorders
Water & Electrolyte balance	1. Illustrate the water distribution in the body 2. Tell about body water, water turnover 3. Explain about regulation of water balance, role of ADH and thirst centre 4. Define osmolarity 5. Illustrate distribution of electrolytes 6. Explain about electrolyte balance: Role of aldosterone, renin angiotensin system and ANF
Hemoglobin Chemistry & Metabolism	1. DescribebrieflythenormalstructureandfunctionofHemoglobin. 2. Hemoglobinsynthesisand breakdown. 3. Listouttheimportantabnormalhemoglobinsandtheireffect
FUNCTION TESTS	1. DescribethebiochemicalfunctionsofkidneyandtheprincipalRenalFunctionTests 2. DescribethebiochemicalfunctionsofliverandtheprincipalLiverFunctionTests 3. DescribebrieflytheThyroidfunctiontests
PRACTICALS	1. Lab safety 2. Glass ware 3. Centrifuge 4. Sample Collection 5. Urine Analysis – Normal constituents 6. Blood Chemistry– Glucose Estimation, Estimation of Urea, Creatinine 7. Demonstration – Lipid profile, Electrolytes 8. Demonstration – Liver Function Tests 9. Demonstration – Thyroid Function Tests 10. Case based clinical biochemistry and interpretation of reports 11. Spotters

Course Outcomes:

At the end of this course student should be able

1. To know the properties, classification and metabolism of carbohydrates
2. To know the properties, classification and metabolism of proteins
3. To know the properties, classification and metabolism of lipids
4. To know the properties, classification and metabolism of nucleic acids
5. To know the properties, classification and metabolism of enzymes and vitamins

References:

1. Concise textbook of Biochemistry DM Vasudevan 2nd edition
2. Essentials of Biochemistry U Satyanarayana, U Chakrapani 2nd edition
3. Essentials of Biochemistry and ocular biochemistry S Ramakrishnan

PSGY100: PHYSIOLOGY
Semester-I
(with effect from 2022-23 admitted batch)

INTRODUCTION

Physiology is the study of functions and mechanisms in a living system. physiology focuses on individual organs, cells, and biomolecules carrying out the chemical and physical functions in a living system. The physiological state is the condition of normal function, while the pathological state refers to abnormal conditions, including human diseases.

Course Objective

- Understand the basic physiological functions of different organs and parts of the human body and important applied aspects

SYLLABUS:

1 - Cell physiology

1. Describe the structure and functions of cell
2. Describe the functions of the cell organelles
3. Describe briefly the types of transport across cell membrane and carrier systems

2 - Blood

1. Describe the normal composition of human blood and its functions
2. Describe the normal plasma proteins & their functions
3. Describe the structure and functions of RBC and hemoglobin
4. Describe the process of Erythropoiesis
5. Describe the Structure, production, & functions of WBCs
6. Describe the structure, production & functions of Platelets
7. Describe the Types of blood groups and their importance,
8. Describe the Mechanism of coagulation

Immunity

9. Define immunity and describe the types of immunity
10. Classify antigen & antibodies
11. Describe T cell immunity & B cell immunity

3 - Digestive system

1. Describe briefly the Physiological anatomy of G.I.T and its functions.
2. Describe briefly the composition and functions of Saliva
3. Describe briefly the physiological anatomy of the stomach and the composition, functions of gastric juice.
4. Describe briefly the functions of pancreas, and the composition & functions of pancreatic juice.
5. Describe briefly the functions of liver and gall bladder and the Composition, and functions of bile juice

4 - Respiratory system

1. Describe the physiological structure and functions of Respiratory tract.

2. Describe the Mechanics of respiration and its regulation
3. Describe the Fundamentals of oxygen and CO2 transport in blood
4. Describe the lung volumes, spirometry & their importance

5 - Cardiovascular system

1. Describe the gross structure of heart and the normal circulation of blood
2. Describe the cardiac cycle
3. Describe the normal arterial pulse wave and the normal heart rate, and factors increasing and decreasing it.
4. Describe normal Blood pressure and its regulation,
5. Describe the normal Heart sounds
6. Describe the normal ECG and its importance

6 - Muscle & nerve & neurology

1. Describe the physiological structure of muscle tissue and its types
2. Describe the parts of neuron and their functions, and the synapse and its function
3. Describe the action potential, its basis, refractory period, latent period, etc. and neuromuscular transmission
4. Describe briefly the autonomic nervous system and the functions and effects of the sympathetic and parasympathetic nervous systems
5. Describe the physiological anatomy of the brain and functions of different lobes
6. Describe briefly the structure and functions of spinal cord
7. Describe briefly the subdivisions of brain stem and their functions
8. Describe briefly the special senses and their pathways – vision, audition (location & taste)
9. Describe the normal EEG,
10. Describe briefly the CSF formation, circulation, properties, composition and functions

Course Outcomes:

1. Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system.
2. Explain Haemopoetic and lymphatic system homeostatic and its altered physiology
3. Explain the anatomy and Physiology of the cardiovascular and respiratory system and its disorders
4. Explain the anatomy and Physiology of digestive, nervous, urinary, and reproductive systems and their disorders
5. Describe the Physiology of muscle contraction and its disorders

References:

1. Text book of physiology for BDS AK Jain 6th edition
2. Text book of physiology for BDS Sembulingam 3rd edition
3. Physiology in nutshell by AK Jain 5th edition
4. Manual of practical physiology for BDS AK Jain 4th edition
5. Handbook of human physiology Vidyaratan 7th edition

LANG1141: ENGLISH
Semester-I
(with effect from 2022-23 admitted batch)

INTRODUCTION:

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ Speaking / Reading/ Writing) skills It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives.

COURSE OBJECTIVES

1. Understand and communicate in simple English, written and verbal
2. Understand and practise the basic principles of English grammar
3. Comprehend and summarise a given English essay/paragraph
4. Understand common English terms used in the medical/ health care field

Syllabus

1. Basic English Grammar 2hrs
2. Grammar - 8 parts of speech. Structure of sentence. Sentence writing. Paragraph writing. 8 hrs Summarizing / precis writing. Reading & comprehension (a small paragraph followed by questions)
3. General English Vocabulary & Use of dictionary 2hrs
4. Common Medical Terminology 2hrs
5. Spoken & Written English 2hrs
6. Listening & Reading skills 2hrs
7. English comprehension & summarizing & inference 2hrs
8. Writing skills - Questions based on prescribed prose/ poetry, letter, Summary, Case history, Medical Report, Documentation, Note taking 8rs
9. Verbal communication - discussion & summarizing. Taking minutes of meeting Writing the minutes. 2hrs

Prescribed Prose -

1. Leo Tolstoy	How much land does a man need?
2. O' Henry	The Last Leaf
3. Frank Stockton	The Lady or the Tiger

Prescribed Poetry –

1. William Shakespeare	The Seven Ages of Man
2. Robert Frost	The Road not Taken
3. John Milton	On his Blindness

COURSE OUTCOMES

By the end of the course, the learners will be able to:

- Think critically, analytically, creatively and communicate confidently in English insocial and professional contexts with improved skills of fluency and accuracy.
- Write grammatically correct sentences employing appropriate vocabulary suitable to different contexts
- Comprehend and analyze different academic texts.
- Make notes effectively and handle academic writing tasks such as Paragraph writing and Essay writing.
- Effectively handle formal correspondence like e-mail drafting and letter writing.

Reference Books:

1. Arosteguy, K.O. and Bright, A. and Rinard, B.J. and Poe, M. A Student's Guide to Academic and Professional Writing in Education, UK, Teachers College Press, 2019

2. Raymond Murphy, English Grammar in Use A Self-Study Reference and Practice Book for Intermediate Learners of English: Cambridge University Press;2019

3. Peter Watkins, Teaching and Developing Reading Skills: UK, CUP, 2018

4. DeepthaAchar et al. Basic of Academic Writing. (1and 2) parts New Delhi: Orient BlackSwan. (2012& 2013).

5. Kumar S and Lata P, Communication Skills: New Delhi Oxford University Press, 2015

CSCI1031:BASICS OF COMPUTERS

Semester-I

(with effect from 2022-23 admitted batch)

Introduction:

Computer science spans theoretical disciplines (such as algorithms, theory of computation, and information theory) to practical disciplines (including the design and implementation of hardware and software). It deals with concepts regarding the architecture of a computer, common application software and uses of computers in everyday life.

Course Objectives:

1. To build necessary concepts regarding the architecture of a computer
2. To develop an understanding of the common application software.
3. To understand the uses of computers in everyday life.

SYLLABUS:

Theory –

1. Describe and identify the principal components of a computer
2. Define the various terms used in computer – hardware/software / operating system
3. Describe the functions and uses of computers including in health care
4. Mention the common types of files including Word documents, Spreadsheets (Excel) and Presentations (PowerPoint) and their uses
5. Basic Network connecting
6. Explain the uses of the internet and email
7. Collaborative work using Google suite of applications / Microsoft Office 365

Practical / Demonstration –

8. Demonstrate use of a computer for common purposes
9. Demonstrate methods for Data storage & retrieval and making folders;
10. Perform functions like date/time setting or changing, change display settings, Installing /removing programs etc.
11. Understand and Use MS Word / Word Document program
12. Prepare a properly formatted, spell-checked document in Word Document including insertion of images and tables and take a print-out/mail as an attachment, and convert to pdf (portable document format)
13. Understand and Use MS Excel / Data spreadsheet
14. Prepare a proper Excel document (spreadsheet) with given data and sort out data, insert / delete cells, etc., use formula bar for common functions like calculate mean etc, convert to pictorial format like bar / pie diagram, etc.
15. Prepare and use computer-based presentations like PowerPoint with appropriate fonts and colours including insertion of images, videos etc.
16. Prepare an appropriate file like excel to enter patient data and retrieve it
17. Use the facility of Mail Merge between Excel to a Word document
18. Sending customized email to selected members
19. Prepare a patient report and take a print out
20. Prepare a database of patient info and lab results for storage and later retrieval
21. Communicate by e-mail including opening email account
22. Demonstrate use of search engines / google search etc. for academic information

Learning Outcomes:

At the end of the training program, the student would be able to

1. Classify various components of the computer.
2. Experiment with the various application software of Microsoft Office suite.
3. Make use of collaborative applications over the internet.

Course Outcomes:

At the end of the course student is expected to

1. Know about the concept and architecture of a computer
2. To understand the common application software.
3. To understand and apply the uses of computers in everyday life.

References –

1. Introduction to Computers by Peter Norton (McGraw Hill Education)
2. Mastering Excel: A Problem-Solving Approach by James Gips (John Wiley and Sons)
3. SAMs Teach Yourself Computer Basics in 24 hours

ENVS1051: ENVIRONMENTAL SCIENCE
Semester-I
(with effective from 2022-23 admitted batch)

INTRODUCTION:

The course enables the students to adapt eco-centric thinking and actions rather than human-centric thinking on natural resources, their utilization and conservation. The course also focuses on the importance of ecosystems, biodiversity and their degradation led to pollution. This course helps in finding solutions through application of control measures to combat pollution and legal measures to achieve sustainable development.

Course Objectives:

1. To impart knowledge on environment and ecology.
2. To familiarize learners about different types of pollution and its measures to control.
3. To introduce learners about natural resources.

Syllabus

UNIT-I

INTRODUCTION TO ENVIRONMENT AND ECOLOGY 06 Hours

Definition of environment, ecology and ecosystem. Components of environment. Natural and man-made changes on environment and disasters.

UNIT-II POLLUTION AND ITS ABETMENT 10 Hours

Air pollution-primary air pollutants, origin, control measures, air quality norms. Land pollution, types of land pollution-their sources, control measures. Solid waste disposal measures. Water resources. Types of water pollution, control measures. Water quality standards. Noise pollution, control measures, acceptable noise levels. Radiation-types, sources of radiation, biological effects of radiation.

UNIT-III NATURAL RESOURCES 04 Hours

Conventional and non-conventional energy resources, energy conservation. Role and uses of forests, effects of deforestation. Wildlife conservation. Forest conservation Act.

COURSE OUTCOMES

After the completion of this course student will be able to

- List components of environment
- Recall natural and man-made environment disaster
- Demonstrate air pollution control measures
- Summarize solid waste disposal measures
- Explain radiation and its biological effects
- Identify conventional and non-conventional energy resources

REFERENCES:

1. ErachBharucha. Textbook of environmental studies for undergraduates Courses-Universities Press, India Private Limited. 2019.
2. Kaushik A and Kaushik C.P. Perspectives in Environmental Studies. New Age International Publishers Edition-VI. 2018.
3. McKinney M.L., Schoch R.M., Yonavjak L. Mincy G. Environmental Science: Systems and Solutions. Jones and Bartlett Publishers. 6th Edition. 2017.
4. Botkin D.B. Environmental Science: Earth as a Living Planet. John Wiley and Sons. 5th edition. 2005.
5. Benny Joseph. Textbook of Environmental Studies 3rd edition, McGraw Hill Publishing company limited. 2017.

PSYC1031: PSYCHOLOGY
Semester-I
(with effect from 2022-23admitted batch)

INTRODUCTION:

Health in its broadest sense includes physical and mental health. Health workers in recent years have become interested in dealing with mental health problems in general health centres. Mental illnesses have been shown to be common, occurring in all societies and in all sections of the population, causing immense suffering and disability.

Course Objective

The objectives of this course is:

- To enable the student to enlist common mental health issues encountered in general health care settings.

SYLLABUS:

Unit I
Behaviors that Cause Concern – Violent Behaviour and Aggression; Confusion and Agitation; Suicide; Seizures; Disturbances Among the Elderly.

Unit II
Symptoms that are Medically Unexplained – Multiple Physical Complaints; Fear and Panic; Sleep Problems; Fatigue; Loss of a Body Function.

Unit III
Problems Arising from Loss and Violence – Trauma; Intimate Partner Abuse; Sexual Assault; Bereavement.

Unit IV
Problems in Childhood and Adolescence – Learning Disturbances; ADHD; Child Abuse; Misbehavior; Enuresis; Depression in Adolescents.

Unit V
Mental Health in Other Contexts – Reproductive Health; Health of Prisoners; Refugees; Disasters; Caring for Carers.

Learning Outcomes
The course enables the student to:

✓ Identify psychological distress states in the general health setting.

✓ Distinguish between psychotic and non-psychotic disorders.

Course Outcomes:

The course enables the student to:

- Identify abnormal mental health conditions in the general health setting that require health professionals' attention.
- To understand the symptoms that distinguish between psychotic and non-psychotic disorders.
- Be able to apply their knowledge and provide help to persons under distress due to calamities caused by man and nature
- To analyse different abnormal conditions in children during developmental stages
- To evaluate abnormal behaviors observed in persons experiencing unusual contexts

References

1. Goldberg, D.P. (1992). Common Mental Disorders: A Bio-Social Model. London: Routledge.
2. Helzer, J.E. &Hudziak, J.J. (2002). Defining Psychopathology in the 23st Century: DSM V and Beyond. Washington DC: American Psychiatric Publishing Inc.
3. Pilgrim, D. (2014). Key Concepts in Mental Health. London: Sage.
4. Patel, V. (2003). Where there is No Psychiatrist. A Mental Health Care Manual. Glasgow: Gaskell.
5. International Journal of Mental Health
6. Community Mental Health Journal

SEMESTER-II

S.No	Course Code	Course Title	Course Category
1	ANAT1011	ANATOMY - II	C
2	BCHE1011	BIOCHEMISTRY - II	C
3	PSGY1011	PHYSIOLOGY - II	C
5	BTSC1041	BIOTECHNOLOGY & MEDICAL PHYSICS (Only Internal exam, no university exam)	FC

ANAT1011: ANATOMY – II
SEMESTER-II
(with effect from 2022-23)

INTRODUCTION:

Anatomy deals with the structural organization of human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture into the clinical domain. The department of anatomy is committed to provide quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides and VARIOUS models provide the ideal environment to learn anatomy during the 1st year of their course.

COURSE OBJECTIVES:

- The objective of this subject is to provide an outline of anatomy to improve the students understanding the technical and diagnostic procedures used, with special emphasis on limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology

Syllabus:

LEARNING OUTCOMES:

After completion of the1st year course -at the end of second semester, the student must be able to know the following:

a. Neurology

1.Mention any four cranial nerves

2.Surfaces & Lobes of cerebrum

3.Parts of Hind brain

4.Cranial nerves

5.Parts of brain stem and cranial nerves attached to it

6.Coverings of Brain

7.Broca's area

8.White fibres of cerebrum

a. Gastro Intestinal Tract

1. Describe briefly the location, surfaces, lobes, relations, and blood supply of Liver?
2. Porta hepatis
3. Parts &Blood supply of stomach
4, Differences between Small& Large Intestines
5. Ligaments of Liver
6. Appendicitis

b. Excretory & Reproductive systems

7. Name the components of female reproductive system and Describe uterusand its supports.
8. Internal structure of kidney

   3.Visceral Relations of kidney

   4.Nephron
9. Coverings of Testis
10. Parts of Fallopian tube
11. Layers of scrotum
12. Spermatic cord 13.Male urethra &its parts

c. Endocrine system & others

1. Name the Endocrine glands and Explain the morphology and blood supply of Thyroid gland.
2. Adenohypophysis
3. Dwarfism
4. Adrenal medulla
5. Diabetes mellitus
6. Blood supply of Thyroid gland
7. Islets of langerhans
8. Goiter
9. Endocrine part of Pancreas

COURSE OUTCOMES:

- This course is aimed to make the student to gain knowledge in basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology which provides foundation in completion of the course.
- Enable to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Liver.
- Enables to understand about the Endocrine glands and explain the morphology and blood supply of Thyroid gland.

References:

1. Anatomy and physiology –Vijaya D Joshi, Ashalatha N Nandedkar, Sadhana S Mendhurwar
2. Anatomy and physiology- InduKhurana and ArushiKhurana
3. Human anatomy &physiology for nursing -Mahindra Kumar Anand&MeenaVerma
4. Understanding human anatomy & physiology- William Davis(McGrawHill)

PSGY1011: PHYSIOLOGY-II

SEMESTER-II

(With effect from 2022-23 admitted batch)

INTRODUCTION

Physiology is the study of functions and mechanisms in a living system. physiology focuses on individual organs, cells, and biomolecules carry out the chemical and physical functions in a living system. Physiological *state* is the condition of normal function and this course helps in understanding the functions of endocrine system, renal physiology and reproductive physiology.

Course Objectives:

- To know about functions and physiological anatomy of endocrine system - Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
- To impart knowledge related to physiological structure of kidney and the nephron and its functions.
- To understand about reproductive system, process and methods of determination of ovulation.
- To know about types of joints, the structure and formation of cartilage and the structure and formation of bone.

SYLLABUS

1 - Endocrine system

1. Describe the physiological anatomy of Thyroid gland, functions and its applied physiology
2. Describe the physiological anatomy of Adrenal gland, functions and its applied physiology
3. Describe the physiological anatomy of Parathyroid gland, functions and its applied physiology
4. Describe the physiological anatomy of Pancreas, its functions and its applied physiology
5. Describe the physiological anatomy of hypothalamus and the Pituitary gland, their functions and its applied physiology

2 - Excretory system

1. Describe the physiological structure of kidney and the nephron and its functions
2. Describe the GFR and factors affecting GFR
3. Describe the Substances absorbed and secreted from renal tubules
4. Describe the various Renal function tests
5. Describe briefly the Urinary bladder and its functions and the physiology of micturition Skin
6. Describe the Structure and functions of skin

3 - Reproductive system

1. Describe the Physiology of Puberty

2. Describe the process of menstruation, normal menstrual cycle, menarche and menopause.
3. Describe briefly the process of Ovulation and methods of determination of ovulation
4. Describe briefly the normal physiology of pregnancy and mention the diagnostic tests for pregnancy and their physiological basis
5. Describe briefly the functions of placenta and pregnancy diagnostic tests
6. List out the Contraceptive methods in male and female
7. Describe the Spermatogenesis

4 - Bone & Joints

1. Describe the types of joints, the structure and formation of cartilage and the structure and formation of bone.

PRACTICALS

HAEMATOLOGY

1. Estimate Hemoglobin in given blood sample
2. Estimate bleeding time & clotting time
3. Measure ESR of given blood sample
4. Perform RBC count of given blood sample
5. Perform WBC count of given blood sample
6. Perform a differential WBC count of the given sample
7. Calculation of blood indices
8. Determine blood group of a given sample

CARDIOVASCULAR SYSTEM

1. Measure pulse rate, heart rate
2. Measure BP
3. Measure weight and height and calculate Body Mass Index
4. Demonstrate examination of heart – inspec JVP, localize apex beat, look for any abnormal pulsations, percuss cardiac dullness, auscultate heart for normal sounds
5. Record an ECG

RESPIRATORY SYSTEM

1. Measure respiratory rate & temperature
2. Demonstrate examination of respiratory system – inspect the chest for symmetry, movements, localize apical impulse and trachea, measure chest expansion, percuss the chest for lung resonance, liver dullness, auscultate lungs for breath sounds
3. Perform spirometry in a given individual and interpret the values

CENTRAL NERVOUS SYSTEM

1. Demonstrate examination of the cranial nerves
2. Demonstrate examination of the motor system – bulk, tone, power of different groups of muscles, coordination, gait
3. Assist in the recording of an EEG
4. Demonstrate the various sensory and motor reflexes - abdominal, plantar, biceps, triceps, supinator, knee, ankle
5. Demonstrate examination of sensory system – fine touch, pain, vibration

Course Outcomes:

- At the end of this course the student will be able to To understand the physio log anatomy Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas and their applied aspects.
- To understand physiological structure and functioning of kidney and the nephron.
- To understand about the physiology of reproductive system and applied aspects
- To know about the types of joints, the structure and formation of cartilage and the structure and formation of bone.

References:

1. Text book of physiology for BDS AK Jain 6th edition
2. Text book of physiology for BDS Sembulingam 3rd edition
3. Physiology in nutshell by AK Jain 5th edition
4. Manual of practical physiology for BDS AK Jain 4th edition
5. Handbook of human physiology Vidyaratan 7th edition

BTSC1041:BIOTECHNOLOGY &MEDICAL PHYSICS

SEMESTER-II

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The human body generates a variety of voltages which are usually very small. When basics of physics and technology get applied to the living things, we name it as Biotechnology which helps the medical personnel or physicians to make a better diagnose of the problem in a patient and provide the appropriate treatment. Biomedical engineering is the application of knowledge and technologies to solve the problem of the living system.

Course Objectives:

- The course is aimed to make the student to understand the principles of medical physics and biotechnology as applicable to health care and practice them in their respective speciality.
- Know about how to use various electronic instruments to record and interpret the overall wellbeing of the human system.
- Understand about the various sensors and transducers used to acquire and record the Bioactivity of a human beings.

SYLLABUS:

Units & Measurement (1-2hrs)

1. Define speed velocity, Work, Energy, Power & their units
2. Define the law of Conservation of energy
3. Describe briefly the Energy changes in human system

Heat (1-2hrs)

4. Define Energy& temperature
5. List out methods for Measurement of temperature & scales & instruments
6. Describe briefly Use of heat & cold in medicine–incl. heat therapy/ cryosurgery etc.

Bioelectric potentials (3)

7. Describe briefly about Electric potentials innerve & neuron
8. Describe briefly about Electric potentials in heart, Brain, Muscle

Electricity &Magnetism in Medicine (2)

9. Describe briefly Basic Principles of electricity, units, measurement, voltage/current etc.
10. Describe briefly the Basic principles of magnetism
11. List out the Applications of electricity in medicine–incl. electric shock in cardiology, psychiatry etc.
12. DescribebrieflytheroleofLowfrequencyelectricity&magnetisminmedicine
13. List out import ant Electrical hazards– types, effects, physiological effects Electromagnetic radiation–properties, interference (1) Sound & Ultrasound (2-3)
14. Describe briefly the General properties of sound & ultrasound
15. Describe the role and uses of Ultra sound in medicine
16. Describe briefly Doppler effect Light (2)
17. Describe briefly the Basic properties of light
18. Describe briefly the important properties & Applications of visible light/infrared /ultraviolet/ lasers in medicine Physical principles underlying Blood flow–(1hr)
19. Describe briefly about laminar flow & turbulent flow
20. Describe briefly the Bernoulli principle

Electronics in biomedical applications (4-5)

21. Describe briefly about Insulators &conductors, Transformers, Motors,
22. Describe briefly about Batteries, Electric power generation, power supply/UPS/voltage stabilizers
23. Describe briefly about Power supply circuits–transformer/rectifier/filter/regulator
24. Describe briefly about Materials–Resistive/Dielectric/Magnetic/Piezoelectricmaterials & their uses Components–(5-6)
25. Describe briefly about resistors/capacitors/inductors
26. Describe briefly about Semi-conductors–diodes/transistors/film circuits/integrated circuits
27. Describe briefly about Amplifiers–voltage amplifiers/power amplifiers/feedbackin amplifiers/operational amplifiers/
28. Describe briefly about Input impedance, output impedance, gain, noise
29. Explain about Distortion, differential amplification
30. Describe briefly about Oscillators and Filters and Modulators–Demodulators

Components–(6-7)

31. Describe briefly about Display devices–lamps/LED/oscilloscope
32. Describe briefly about recording devices
33. Describe briefly about Process controllers
34. Describe briefly about Digital electronics
35. List out the Bioactivity monitoring instruments
36. Describe briefly about Transducers–pressure, temperature, velocity, flow,vibration
37. List out the Electrodes–different types & application
38. Describe briefly about Amplifiers & application in medicine
39. Describe briefly about the Principles of averaging & signal analysis
40. List out the common methods of Trouble shooting & analysis of medicalinstrumentation

Course Outcomes:

After completing this course, the student should be able to

- Get acquainted with the principles involved in using various electronic instruments to record and interpret the overall wellbeing of the human system.
- Know about Electric potentials and their origination
- Understand the applications of electricity in medicine
- Explain about the various sensors and transducers used to acquire and record the Bioactivity of a human being
- Know the common methods of Trouble shooting & analysis of medical instrumentation.

References:

1. Leslie Cromwell, Biomedical Instrumentation and Measurement, Prentice hall of India, New Delhi, 2007.
2. Joseph J.carr and John M. Brown, Introduction to Biomedical Equipment Technology, John Wileyand sons, New York, 4th Edition, 2012
3. Khandpur R.S, Handbook of Biomedical Instrumentation, , Tata McGraw-Hill,New Delhi, 2nd Edition, 2003.
4. D. Patranabis, Principles of Industrial Instrumentation', Tata McGraw-Hill Publishing, 1976.
5. D.P. Kothari, I. J. Nagrath, "Basic Electronics", McGraw Hill Education (India) Private Limited, 2014.
6. John G. Webster, Medical Instrumentation Application and Design, John Wiley andsons, NewYork, 1998.
7. M.Arumugam, 'Bio-Medical Instrumentation', Anuradha Agencies, 2003.
8. Robert Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory" PHI; 8th Edition.2001.

SEMESTER-III

S. No.	Course Code	Course Title	Course Category
1	PHCG2001	PHARMACOLOGY - I	C
2	MIBG2001	MICROBIOLOGY - I	C
3	PATH2001	PATHOLOGY - I	C
4	CMED2001	COMMUNITY MEDICINE & SOFT SKILLS	C
5	NURS2001	BASICS OF PATIENT CARE (No Uni. Exam)	FC
6	RADG2001	RADIOLOGY & IMAGING TECHNOLOGY - I	C

SEMESTER-III

PHCG2001 - PHARMACOLOGY:

(with effect from 2022-23 admitted batch)

INTRODUCTION:

Basic drug effect, classification of drugs acting on nerves, heart, blood pressure, respiratory system, gastrointestinal system, kidneys, hormones, musculoskeletal system and analgesics etc., Common drugs- effects and side effects and drug interactions.

COURSE OBJECTIVES:

- This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

SYLLABUS

Theory

S.No	System	Topic	No. of hours
1.	General Pharmacology	Introduction Pharmacokinetics Pharmaco dynamics Pharmaco vigilance	1 2 2 1
2.	Autonomic Nervous System & Skeletal Muscle Relaxants	Parasympathetic drugs Sympathetic drugs	5
3.	Autacoids	Prostaglandins, Histamines, antihistamines RAAS	1 1
4.	Cardiovascular System & Blood	Drugs used in Angina Anti-hypertensives Anticoagulants Thrombolytics Antiplatelets Hematinics	5
5.	Renal System	Diuretics	2
	Total Hours		**20**

Practical

S.No	Topic	No. of hours
1.	Spotters – Sources of drugs, Dosage forms, drug administration devices, photographs of scientists, adverse drug reactions	3
2.	Case based discussion of Pharmacotherapy or Side effects	7
	Total Hours	**10**

COURSE OUTCOMES:

At the end of course, students should know about

1. Pharmacokinetics and pharmaco dynamic principles of drugs
2. Drugs acting on autonomic nervous system
3. Drugs modulating autacoids
4. Drugs used in cardiovascular and hemodynamic disorders.
5. Drugs acting on renal system

References:

1. Essence of Pharmacology by K.D. Tripathi

2. Pharmacology and Pharmacotherapeutics by Satoskar

3. Text book of Pharmacology for Allied Sciences – Padmaja Udaykumar

SEMESTER-III

MIBG2001 – MICROBIOLOGY:

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Microbiology is to provide understanding of the natural history of infection and diseases in order to deal with the Etiology, pathogenesis, Pathogenecity, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

1. Plan and interpret Laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
2. Perform simple laboratory test which help to arrive at rapid diagnosis.
3. Understand methods of disinfection and sterilization and their application to control and prevention of hospital acquired infections.

SYLLABUS:

Theory – 25hrs & Practical 15 hrs

S.No	Topic	Hours
1.	Introduction of brief history of Microbiology	1
2.	Historical Aspect Relationship of Micro-organism to men	1
3.	Micro-organism in Disease and Health Requirement	1
4.	Uses of common Laboratory equipment Incubator, Hot Air Oven, Water Bath Anaerobic Jar, Centrifuge, Autoclave Microscope	2
5.	Glassware : Description of Glassware, its use, handling and care	1
6.	Sterilization: Definition Classification and General Principal of Sterilization Autoclave – its structure, functioning, control and indicator Definition Types Mode of Action Uses	2
7.	Collection, Transportation and processing of clinical samples for Microbiological Investigations	1
8.	Antibiotic susceptibility testing	1
9.	Universal precautions	1
10.	Bacteriology: Definition Bacteria – General characteristics of Bacteria Classification	1
11.	Morphology of Bacteria Structure of Cell, Capsule, Flagella, and Spore Growth	2
12.	Physiology of bacteria	1
13.	Staphylococci and Streptococcal infections	2
14.	Meningococci and Gonococci	2
15.	Gram negative bacterial infections	1
16.	Tetanus and gas gangrene	2
17.	Tuberculosis	1
18.	Leprosy	1
19.	H. influenza	1
	Total hours	25

S.No	Practical	Hours
1.	Microscopy	1
2.	Care of glassware and sterilization practices	2
3.	Media pouring	1
4.	Slide preparation	1
5.	Smear preparation	1
6.	Hanging drop	1
7.	Simple staining	2
8.	Gram stain	2
9.	Acid fast stain	2
10.	Disinfection	2
11.	Total hours	15

COURSE OUTCOMES:

- Knowledge about the association of Micro-organisms in Disease and Health Requirement and the common pathogens of Medical importance
- Know about the commonly used Microbiology Laboratory equipment and the cleaning of glassware
- Know about Collection, Transportation and processing of clinical samples for Microbiological Investigations
- Knowledge about Sterilization and Disinfection practices
- Development of skills of Media pouring
- Slide and Smear preparation
- Performing Staining techniques in Microbiology (Simple staining, Gram's staining, AFB staining)

References:

1. Ananthanarayan and Paniker's Textbook of Microbiology – 10th edition
2. Textbook of Microbiology C P Baveja

SEMESTER-III

PATH2001 - PATHOLOGY:

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Pathology is to provide comprehensive knowledge of the causes and mechanisms of the duties in order to enable to achieve complete understanding of the natural history and clinical manifestation of the diseases.

COURSE OBJECTIVES:

1. To describe the rationale and principles of technical procedures of diagnosticlaboratory tests.
2. To know about basic diagnostic tests and correlate with clinical andmorphological features of diseases.
3. To learn about commonly used bedside tests on blood, urine and other relevantsamples.

SYLLABUS:

Unit –I

- Cell injury and death
- Shock

Unit – II

- Inflammation – Acute and chronic inflammation

Unit – III

- Neoplasia

Unit – IV

- Malignancies – Thyroid, breast, stomach, kidney, prostate, ovary, cervix, endometrium, lung, bone, and soft tissue, skin.

Unit – V

- Hematology –
  - Anemia – Iron deficiency anemia, Megaloblastic anemia , Aplastic anemia
  - Polycythemia
  - Leukemia

COURSE OUTCOMES:

1. At the end, the students shall be able to describe the rationale andprinciples of technical procedures of diagnostic laboratory tests.
2. Interpret diagnostic laboratory test and correlate with clinical andmorphological features of diseases.
3. Perform simple bedside tests on blood, urine and other biological fluidsamples.

References:

1. Pathologic basis of disease – Robbins & Cotran 10th edition
2. Pathology – Harshmohan 8th edition
3. Textbook of Pathology for Allied Health Sciences – Ramdas Nayak
4. Textbook on Pathology for DMLT and Paramedical courses – Dr. I.Clemen
5. Essentials of Clinical Pathology – Shirish. M. Kawthalkar 2nd edition

SEMESTER-III
CMED2001 – COMMUNITY MEDICINE
(with effect from 2022-23 admitted batch)

INTRODUCTION:

The art and science of application of technical knowledge and skills to the delivery of health care to given community, designed in collaboration with related professionals as well as human and social science on one hand and the community on the other hand. Preventive medicine is science and art of preventing disease, prolonging life and promoting physical and mental health and efficacy.

COURSE OBJECTIVES:

- To orient the students with national health programmes
- To learn categories and coding of hospital waste and their disposal methods.
- To know various occupational health hazards and prevention and control of them.
- To make the students aware of tabulation of data, measuring mean and SD

SYLLABUS:

(Total 100 marks- (60 theory and 40 practical)

Concepts of disease:

1. Describe natural history of disease with diagram
2. Determinants and dimensions of health
3. Multifactorial causation of disease
4. Epidemiological triad
5. Explain concepts of prevention and modes of intervention with examples
6. Risk factors and risk groups
7. Ice berg phenomena of disease
8. Screening of diseases.

General epidemiology

1. Describe various tools of measurement in epidemiology (rate, ratio, proportion) and measures of morbidity (incidence, prevalence etc).
2. Classification of epidemiological methods and explain briefly each method

Nutrition

1. Classify foods and nutrients and describe concept of balanced diet
2. Describe the common vitamin deficiency disorders and their preventive measures.
3. Outline the common nutritional problems in India and their prevention –Protein Energy Malnutrition, Anaemia
4. Describe role of nutritional factors in hypertension, diabetes, cardiovascular disorders and cancer
5. Food sanitation, food fortification, food adulteration
6. Nutritional assessment .

Occupational Health :

1. List out the important occupational hazards and preventive measures
2. Enumerate benefits under ESI act

Environment and health : Water borne diseases, methods of water purification at household level , Collection of water samples, transport and bacteriological analysis.

Soft Skills , Health Education& communication - Methods with examples., Principles

Practical:

1. Nutrition spotters
2. Growth chart
3. Occupational health spotters
4. Bio-statistics: Types of data, Descriptive statistics,
5. Sensitivity, specificity, Positive predictive value, Negative predictive value of a diagnostic test

COURSE OUTCOMES:

- This course is aimed to make the student to understand national health programs, hospital waste management, occupational health hazards prevention and control of occupational diseases and calculation of measures of central tendency and diagrammatic representation of data.

References:

1. Park's Textbook of Preventive and Social Medicine – 26th edition
2. Statistics and Research: Mahajan

NURS2001 – BASICS OF PATIENT CARE

(with effect from 2022-23 admitted batch)

INTRODUCTION:

This course develops knowledge and skills basic to patient care undergoing radiographic procedures. Topics include patient communication, patient assessment, and safety of patient and healthcare provider in the health care facility. Focus extends to include proper body mechanics and patient positioning to promote comforting for patient. Basics of infection control and methods of medical asepsis were focused on especially when dealing with patients undergoing certain invasive procedures. Finally describe and perform basic procedures like injections, Ryle's tube, Foley's catheterization, taking blood samples, wound dressing etc.

COURSE OBJECTIVES:

1. Students will gain understanding of the fundamental concepts of patients care while in the hospital or undergoing a special procedure.
2. Students will become familiar with some procedures relevant to patient condition
3. Students will Be able to provide certain basic procedures and identify symptoms of altered cognition.
4. Students will be able to relate them to patient overall health and well being.
5. Relationship between certain procedures, radiographic procedure, and patient overall health will be emphasized.

SYLLABUS:

LEARNING OUTCOMES:

The main Intended Learning Outcome (ILO) that is measured throughout this course is "Critical Thinking." This ILO is conceptually defined as "a cognitive process that aims at using the rational and logical examination of ideas for the purposes of understanding, problem solving, and decision-making." Critical thinking will facilitate the process of teaching/ learning, which is originally a change in thinking or behaviour.

I- Caring

II- Communication

III- Critical thinking

IV- Therapeutic intervention

V - Leadership

VI- Employer's satisfaction

Unit No.	Learning objectives	Content
I	Describe the principles of care of bedridden patient	Care of a bedridden patient - Patient assessment - Assessing personal concerns of patient - Assessing physiological needs - Assessing current physical status
II	Describe the basic principles of communication	Communication with patients and attendants - Communication skills - Communication with patients - Special circumstances in communication - Patient education - Communication with patient's families - Dealing with death and loss
III	Describe and demonstrate techniques to maintain patient hygiene	Patient hygiene - Cycle of infection - Body's defence against infection - Infectious diseases - Maintaining hygiene
IV	Describe and practice infection control measures in the ward and ICU	Infection control measures in the ward and ICU - Microorganisms - Cycle of infection - Hand Washing - Preventing disease transmission
V	Describe and record vital data and basic clinical parameters	Vital data and basic clinical parameters -Assessment of body temperature: sites, equipments and techniques, special considerations - Assessment of pulse: Sites, location , equipments and technique, special consideration - Assessment of respirations: technique, special Consideration Recording of vital signs
VI	Describe and demonstrate how to monitor patients	Patients monitoring Assessing personal concerns of patient - Assessing physiological needs - History taking - Physical assessment
VII	Describe the principles of patient safety	Patient safety - Patient transfer - Restraints and immobilization - Accidents and incident reports - Fire hazards - Other common hazards

VIII	Describe and demonstrate the principles of cleaning, disinfection and sterilization in the hospital wards/ ICU	Principles of cleaning, disinfection and sterilization in the hospital wards/ ICU - Hand washing: simple, hand antisepsis and surgical antisepsis (scrub) - Isolation: source and protective -Sterile packs - Surgical scrubbing - Gowning and gloving -Sterilization - Fumigation - Autoclaving
IX	Describe the common routes for drug administration	Common routes of drug administration and precautions to be taken -Assess the patient's condition - Recognize different definitions associated with pharmacology - Recognize various classifications of drugs - Identify the ten rights of drug administration - List out common routes and methods of drug administration - Perform venipuncture using appropriate universal Precautions
X	Describe and perform basic procedures	Basic procedures like -Injections, -Ryle's tube, -Foley's catheterization, -Taking blood samples, -Wound dressing,
XI	Describe and demonstrate documentation of patient related data	Documentation of patient related data in the case sheet records -History taking data sheet - Documentation: Purpose of Recording and reporting, Communication within the Health Care Team, - Types of records; ward records, medical/nursing records, Common Record-keeping forms, - Computerized documentation
XII	Describe and demonstrate use of basic hospital equipment	Use of basic hospital equipment

COURSE OUTCOMES:

1. Perform basic infection control practices in the Healthcare setting.
2. Use effective skills to draw blood and accurately label tubes
3. Perform basic procedures using advanced technique and interpretation.
4. Perform basic patient care skills.
5. Communicate with a diverse patient population using written and oral communication and listening skills in interactions.

References:

1. Ehrlich, R., A., McCloskey, E. D., & Daly, J., A. (2004). *Patient Care in Radiography with an Introduction to Medical Imaging.* Mosby: An Affiliate of Elsevier. Sixth edition.

2. Adler, A., M., & Carlton, R., R. (2007). *Introduction to Radiologic Sciences and Patient Care*. Saunders: Elsevier. Fourth edition

3. Torres, L.,S. (1989). *Basic Medical Techniques and Patient Care for Radiologic Technologists*. J. B.Lippincott Company: Philadelphia. Third Edition.

RADG2001 - RADIOLOGY & IMAGING TECHNOLOGY - I
(with effect from 2022-23 admitted batch)

INTRODUCTION:

B.Sc. Radiology & Imaging Technology meticulously structure to impart in depth advance knowledge of imaging methods and principles. The curriculum has been designed to meet the growing needs of professionals in the field of clinical radiography, imaging technology and radiation safety. Students benefit from doing the course as there is a large volume of work in all areas.

COURSE OBJECTIVES:

- Know about X RAY, Mammography, CT scan and MRI procedures
- To train in assisting specialized radiological procedures.
- To know about how to do the image processing**.**

SYLLABUS:

Radiological Physics & Dark Room Techniques:

I. X-rays - Generation, Properties and Interaction:

Electromagnetic radiation, spectrum and general properties: Wave and quanta concept, Processes of x-ray generation: General and characteristic radiation, X-ray spectrum, factors influencing the intensity of x-rays.

Basic interactions between diagnostic x-rays and matter: Coherent scattering, photo electric effect and Compton Effect — probability of occurrence and its applications in radiology. Biological effects of radiation. Attenuation: Linear and mass attenuation coefficients, Half Value Layer, Factors affecting attenuation, practical aspects of these phenomenon in Radiology, scatter radiation.

II. Radiation Protection & Measurements:

Radiation quantities and units, Radiation measuring instruments: Gas-filled detectors: ionization chamber, proportional counter, Geiger-Muller counter, scintillation counter, solid-state detector, Personal monitoring devices: Film, Thermoluminescent and Pocket dosimeters.

Aim of radiation protection, the concept of As Low As Reasonably Achievable, International Commission on Radiation Protection (ICRP) and Atomic Energy Regulatory Board (AERB) recommendations, maximum permissible dose, Principles of protection in X-ray department for patient, personnel and public, Time-Distance-Shielding, protective devices , X-ray room design.

III. Radiographic photography:

X-ray films, Screen — film cassette, Characteristic curve, Radiographic Image Quality, Automatic Film Processor, Laser camera: Wet and Dry, Computed Radiography & Digital Radiography.

Construction of dark room, dry bench, wet bench, processing of film, developer, fixer, hangers, and safelight

Radiological Equipment:

1. **Electric Power & Transformers:**
   - Generation and distribution of electric power, Single and Polyphase supply, Fuses, Earthling.
   - Construction, types, working principle and losses of transformers.
   - Auto transformer: Construction, Working principle and Applications.

2. **X-Ray equipment & units:**

Construction of diagnostic X-ray tube: Stationary and rotating anode type, Line — Focus principle, Heel effect, X-ray tube rating, Grid controlled and Metal - Ceramic X-ray tubes. Mammography, Mobile X-ray unit, Dental x-ray unit, Dual Energy X-ray Absorptiometry.

3. **X-Ray Generators:**

Filament and High Voltage circuits, Single phase generators. Self, Half wave and Full wave rectified, Three phase generators: 6 pulse — 6 rectifier, 6 pulse — **12** rectifier, **12** pulse — **12**

rectifier circuits, Power Storage Generators, High Frequency Generators, Falling Load Generators, Exposure Switches and Timers.

Accessories in Fluoroscopy:

X-ray beam restrictors, filters: Inherent, added, k-edge filters. Grids: Types, grid-ratio grid cut-off, moving grid. Air gap technique.

Basic principle, construction and working principle of image intensifier tube. Image characteristics, Image display and recording devices.

Positioning in Radiography :

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.

I. Positioning Radiography — I
Skeletal System

i) Upper Limb
Techniques for hand-fingers-thumb-wrist joint-forearm-elbow joint-humerusshoulder joint and sterno-clavicular joint.

ii) Lower Limb
Techniques for foot-calcaneum-ankle joint-leg-knee joint-patella-and femur(lower two thirds)

iii) Pelvic Girdle
Techniques for pelvic-iliac fossa-ischium-and sacro iliac joint.

iv) Vertebral Column
Techniques for Atlanto-occipital articulation, cervical vertebrae, cervicothoracic junction, thoracic vertebrae, lumbar vertebrae, lumbosacral articulation, sacrum

v) Coccyx

vi) ***Bones of Thorax*** Techniques for sternum, ribs (upper and lower).

vii) Skull
Techniques for cranium, facial bones, sella turcica, temporal Bone, martoids and optic foraminae, sinuses, mandible and temporo mandiblejoint.

viii) ***Chest*** Chest X-Ray, PA, AP lateral, decubitus etc._

ix) Abdomen
Routine and radiographs in acute condition

Bedside radiography —techniques for acute chest conditions-intestinal obstruction, abdominal perforations-vertebral injuries-skull injuries-fractures immobilized.

Theatre radiography-introduction to C-arm image intensifier- exposure & training.

II. Soft tissue radiography

Neck, abdomen, skull, mammogram

Practicals

1. X-ray beam alignment test
2. Determination of magnification by changing Source to Image Distance
3. Determination of magnification by changing Object to Image Distance
4. Radiation Protection Survey
5. Leakage radiation test
6. Positioning Radiography

COURSE OUTCOMES:

- Should be able to undertake X RAY, Mammography, CT scan and MRI procedures independently.
- Assist in specialized radiological procedures.
- Able to do the image processing.
- Should be able to handle all radiological and imaging equipment independently.

References:

1. Textbook of radiology for residents and technicians – Satish K Bhargava- 5th edition
2. Handbook of Medical Radiography latest edition by C Ram Mohan
3. Radiographic positioning Niranjan Baghel
4. Clarks procedures in diagnostic imaging by Whitley
5. Radiologic science for technologists 11th edition Elsevier

SEMESTER: IV

S.No.	Course Code	Course Title	Course Category
1	PHCG2011	PHARMACOLOGY - II	C
2	MIBG2011	MICROBIOLOGY - II	C
3	PATH2011	PATHOLOGY - II	C
4	CMED2011	COMMUNITY MEDICINE - IV	C
5	RADG2011	RADIOLOGY & IMAGING TECHNOLOGY - II	C

PHCG2011 – PHARMACOLOGY

(with effect from 2022-23 admitted batch)

INTRODUCTION:

Basic drug effect, classification of drugs acting on nerves, heart, blood pressure, respiratory system, gastrointestinal system, kidneys, hormones, musculoskeletal system and analgesics etc., Common drugs- effects and side effects and drug interactions.

COURSE OBJECTIVES:

- This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

SYLLABUS:

Theory – 20hrs & Practical 10 hrs

Theory

S. No	System	Topic	No. of hours
1.	Central Nervous System	Sedatives Antiepileptics Drugs used in Parkinsonism General Anaesthetics Local Anaesthetics Opioids NSAIDs	1 1 1 2 1 1 1
2.	Respiratory System	Drugs used in Bronchial Asthma	1
3.	Gastrointestinal System	Anti Emetics Drugs for peptic ulcer	1 1
4.	Endocrine System	Antidiabetic drugs Antithyroid drugs Drugs acting on Uterus	1 1 1
5.	Chemotherapy	Antibiotics Antiviral drugs	5 1
	Total Hours		**20**

Practical

S. No	Topic	No. of hours
1.	Spotters – Sources of drugs, Dosage forms, drug administration devices, photographs of scientists, adverse drug reactions	3
2.	Case based discussion of Pharmacotherapy or Side effects	7
	Total Hours	**10**

COURSE OUTCOMES:

At the end of course, students should know about

1. Drugs acting on central nervous system
2. Drugs used in treatment of bronchial asthma
3. Drugs used as anti emetics and in peptic ulcer diseases.
4. Drugs used in the treatment various endocrine disorders.
5. Chemotherapeutic drugs.

REFERENCES:

1. Essence of Pharmacology by K.D. Tripathi
2. Pharmacology and Pharmacotherapeutics by Satoskar
3. Text book of Pharmacology for Allied Sciences – Padmaja Udaykumar
4. Pharmacology for Nurses Tara V.Shanbhag, 2nd edition

MIBG2011 – MICROBIOLOGY

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Microbiology is to provide an understanding of the natural history ofinfection and diseases in order to deal with the Etiology, pathogenesis, Pathogenicity, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

1. Plan and interpret Laboratory investigations for diagnosis of infectious diseases and correlate the clinical manifestations with the etiological agent.
2. Perform simple laboratory test which help to arrive at rapid diagnosis.
3. Understand methods of disinfection and sterilization and their application to control and prevention of hospital acquired infections.

SYLLABUS:

Theory – 25hrs & Practical 15hrs

S.No.	Topic	Hours
1.	Immunology : Antigens and antibodies	1
2.	Antigen and antibody reactions	1
3.	Hypersensitivity	1
4.	Immunohematology	1
5.	Autoimmunity	1
6.	Virology : Introduction to viruses and lab diagnosis of viral infections	1
7.	Common viral infections	1
8.	HIV	1
9.	Hepatitis viruses	1
10.	Dengue virus	1
11.	Rabies virus	1
12.	Parasitology : Definition General Characteristics of Parasite Classification of Parasite Mode of transmission	2
13.	Entamoeba histolytica and protozoan diarrhealpathogens	1
14.	Malarial parasites	1
15.	Helminths	1
16.	Cysticercosis	1
17.	Mycology : Common mycological infections and lab diagnosis	1
18.	Candida	1
19.	Superficial fungal infections	1
20.	Systemic mycosis , cryptococcus	1
23.	Opportunistic mycoses	1
22.	Infection control and prevention	1
23.	Good laboratory practices	1
24.	Safe infusion practices	1
25.	Safety in laboratory	1
	Total Hours	25

S.No	Practical	Hours
1.	Microscopy	1
2.	Specimen collection and Handling	1
3.	Sputum examination	1
4.	Stool examination	2
5.	Slide preparation staining and examination	2
6.	Serology	1
7.	Virology	1
8.	ELISA	1
9.	ICT Tests	1
10.	Gram staining	2
11.	Acid fast staining	2
12.	Total hours	15

COURSE OUTCOMES:

- Knowledge about the Basics of Immunology
- Know about the Common viral infections and their Specimen collection and Handling
- Know about the Common parasitic infections and their Specimen collection andHandling
- Know about the Common fungal infections and their Specimen collection and Handling
- Knowledge about Good laboratory practices, Safe infusion practices and Safetyin laboratory
- Knowledge about the commonly performed serological tests in the diagnosis ofvarious diseases
- Knowledge about the commonly performed Rapid diagnostic tests in the diagnosis ofvarious diseases

REFERENCES:

1. Ananthanarayan and Paniker's Textbook of Microbiology – 10th edition
2. Textbook of Microbiology C P Baveja

PATH2011 – PATHOLOGY: SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The goal of teaching Pathology is to provide comprehensive knowledge of the causes and mechanisms of the duties in order to enable to achieve complete understanding of the natural history and clinical manifestation of the diseases.

COURSE OBJECTIVES:

1. To describe the rationale and principles of technical procedures of diagnostic laboratory tests.
2. To know about diseases of Haematology, GI tract respiratory system, cardiovascular system and endocrinology.

SYLLABUS:

Unit –I

- Hematology – Lymphoma
- Kidney - Glomerulonephritis, CKD, Tumors

Unit – II

- Thyroid – Goitre, Tumors
- Heart – Myocardial Infarction, Rheumatic Fever, Hypertension

Unit – III

- Infections – Abscess, TB, HIV/AIDS, Amebiasis, Malaria, Meningitis, UTI

Unit – IV

- Lung – Asthma, COPD
- Liver - Hepatitis

Unit – V

- GIT – Peptic Ulcer Disease, Gastritis

COURSE OUTCOMES:

1. To impart knowledge on various common infectious diseases with its lab diagnosis and Hematological malignancies.
2. Make student familiar with predisposing factors, etiopathogenesis, morphology and complications of common diseases of kidney, lung, liver, git, heart and thyroid.

3. To demonstrate few special staining techniques and body fluid analysis.
4. To acquire knowledge about handling of tissue specimens, histopathology techniques, automated processors and few specimens and slides in histopathology

References:

6. Pathologic basis of disease – Robbins & Cotran 10th edition

3. Pathology – Harshmohan 8th edition

4. Textbook of Pathology for Allied Health Sciences – Ramdas Nayak

5. Textbook on Pathology for DMLT and Paramedical courses – Dr. I.Clemen

6. Essentials of Clinical Pathology – Shirish. M. Kawthalkar 2nd edition

CMED2011 - COMMUNITY MEDICINE:
SEMESTER-IV

(with effect from 2022-23 admitted batch)

INTRODUCTION:

The art and science of application of technical knowledge and skills to the delivery of health care to given community, designed in collaboration with related professionals as well as human and social science on one hand and the community on the other hand. Preventive medicine is science and art of preventing disease, prolonging life and promoting physical and mental health and efficacy.

COURSE OBJECTIVES:

- To orient the students with levels of health care, primary health centre and community health centre.
- To understand about ethics in professionalism.
- To know acts like PCPNDT, Organ transplantation etc.
- To make the students aware of tabulation of data, measuring mean and SD

SYLLABUS:

(Total 100 marks- (60 theory and 40 practical)

Infectious diseases epidemiology :

1.Define terms- infection, contamination, infectious disease, contagious disease, communicable disease, epidemic, endemic, sporadic, pandemic, zoonotic, nosocomial, iatrogenic, eradication, control, surveillance, incubation period, isolation, quarantine.

2. Dynamics of disease transmission in terms of chain of infection, direct &indirect transmission, mode of disease transmission .

3. Methods of control with examples

3. Immunization, Types of immunity, types of vaccines, immunization schedule

4. cold chain ,AEFI

5. Disinfection, properties of ideal disinfectant, types, examples , recommended disinfecting procedures. Disinfection and sterilization at health care centre level .

6. Epidemiology of Communicable diseases: TB, HIV, Tetanus, Rabies, vector borne diseases (Malaria, Dengue), food poisoning, Acute Diarrhoea, Acute Respiratory Infections

7 Non-communicable diseases: Risk factors for NCDs, Epidemiology, preventive measures for Hypertension, Diabetes, Cardiovascular Diseases, obesity, accidents .

7. Epidemiology and preventive measures of common cancers

9. National Health Programs :

A) National Tuberculosis Elimination Program

B) National Vector Borne Disease Control Program

C) National AIDS Control Program

D) RCH , nutritional programs, UIP,

10. Primary health care- definition, principles of primary health care

13. Primary health centre- functions, staff pattern.

14. Biomedical waste management : Biomedical waste – Sources, hazards, categories &coding, disposal

15. Principles of medical ethics and common ethical issues, Medical negligence, Consumer Protection Act

16. Demography and Family planning:

Factors influencing population growth , Birth rate, death rate
Methods of contraception –Types , mechanism of action, advantages, disadvantages, side effects
Sources of health information -Census, SRS , Registration of births and deaths .

Practical:

1. Hand washing technique
2. Communication skill – Gather, ICTC-Provider initiated, Client initiated
3. Biomedical waste management spotters
4. Family planning spotters .

COURSE OUTCOMES:

After completing this course, the student should be able to

1. Understand levels of health care and elements & principles of primary health care
2. Know about functions of PHC and CHC
3. Understand and apply measures of central tendency and dispersion
4. Understand and apply statistical tests related to diagnosis

References:

1. Park's Textbook of Preventive and Social Medicine – latest edition
2. Statistics and Research: Mahajan 9th edition
3. Sunderlal textbook of preventive and social medicine 6th edition
4. Suryakanha Recent advances in community medicine 6th edition

RADG2011 - RADIOLOGY & IMAGING TECHNOLOGY-II

SEMESTER-IV

(with effect from 2022-23)

INTRODUCTION:

B.Sc. Radiology & Imaging Technology meticulously structure to impart in depth advance knowledge of imaging methods and principles. The curriculum has been designed to meet the growing needs of professionals in the field of clinical radiography, imaging technology and radiation safety. Students benefit from doing the course as there is a large volume of work in all areas.

COURSE OBJECTIVES:

- To train regarding techniques, Preparations, Instructions, Positioning of patient for conventional and digital radiography in the imaging.
- To know about conventional Non contrast radiography (Extremities, Spine, Skull, Chest, Abdomen & Pelvis, Soft tissue, Dental Radiography, Foreign body localization)
- To know about Contrast & Special Radiography procedures

SYLLABUS:

Radiographic Procedures :

I. **Contrast Media** Types, composition, uses, contraindications
II. **Contrast Procedures - I**

Barium Swallow-Barium meal series-Barium enema-double contrast barium enema, small bowel enema, double and single contrast, ERCP, PTBD, sinograms, fistulograms.

III. **Contrast Procedures - II**

IVU, retrogrde pyelogram, MCU, AUG, Opposing

Urethrogram, Dacrography, Sialogram, HSG,

T-Tube cholangiogram, operative cholangiogram (on table in theatre).

Basic and Advanced Ultrasound Imaging Physics:

I. **Ultrasound - Generation, Properties and Interaction:** Basic Acoustics, Ultrasound terminologies: acoustic pressure, power, intensity, impedance, speed, frequency, dB notation: relative acoustic pressure and relative acoustic intensity. Basic Acoustics,

Ultrasound terminologies: acoustic pressure, power, intensity, impedance, speed, frequency, dB notation: relative acoustic pressure and relative acoustic intensity.

Basic Acoustics, Ultrasound terminologies: acoustic pressure, power, intensity, impedance, speed, frequency, dB notation: relative acoustic pressure and relative acoustic intensity.

Interaction of US with matter: reflection, transmission, scattering, refraction and absorption, attenuation and attenuation coefficients.

Production of ultrasound: Piezoelectricity, Medical ultrasound transducer: Principle, Construction and Working, Characteristics of US beam.

II. **Image Formation, Display and Quality:** Ultrasound display modes: A, B, M, T-M mode, B-scan, Scan-converters: Analog and Digital, US Machine Controls, US focusing. Real-time ultrasound: Line density and frame rate, Real-time ultrasound transducers: mechanical and electronic arrays, Ultrasound Artifacts

III. Doppler Ultrasonography Physics:

Doppler Effect, Doppler ultrasound techniques: Continuous Wave Doppler, Pulsed Doppler, Duplex scanning, Doppler spectrum, Color Doppler, Power Doppler

Techniques In Ultrasonography

Techniques for imaging different anatomic areas, Patient preparation for Doppler, Vascular sonography, Neurosonogram, Sonohysterography, Sonourethrography, Elastography, Musculoskeletal USG.

I. Techniques in Doppler Ultrasonography:

Doppler Effect, Doppler ultrasound techniques: Continuous Wave Doppler, Pulsed Doppler, Duplex scanning, Doppler spectrum, Color Doppler, Power Doppler

II. Recent Advances in Ultrasonography :

1. USG Contrast agents
2. Harmonic imaging
3. Extended FOV imaging
4. 3D US imaging: acquisition methods & reconstruction
5. 4D & 5D US imaging.

PRACTICALS

1. Basic Ultra sound techniques, Practicals based on theory
2. Contrast Procedures and Positioning Radiography.

COURSE OUTCOMES:

- To be able to assist and perform in preparations, Instructions, Positioning of patient for conventional and digital radiography.
- To assist in conventional Non contrast radiography
- To assist in Contrast & Special Radiography procedures

REFERENCES:

1. Textbook of radiology for residents and technicians – Satish K Bhargava- 5th edition
2. Handbook of Medical Radiography latest edition by C Rammohan
3. Radiographic positioning Niranjan Baghel
4. Clarks proedures in diagnostic imaging by Whitley
5. Radiologic science for technologists 11th edition Elsevier

RADG2011 - RADIOLOGY & IMAGING TECHNOLOGY-II
SEMESTER-V
(with effect from 2022-23)

Basics & Advances in CT Imaging Physics :

I.CT Imaging - Principle: Basic principle of Computed Tomography, Comparison of CT with Conventional
Radiography and Tomography, Generations of CT

II. Instrumentation:
Gantry, Patient couch, X-ray tube, Filters, Collimators, Detectors, Data Acquisition System (DAS).

Advances in CT

Image Formation in CT, CT Image Reconstruction, Hounsfield Unit, Windowing, CT image display, CT Image Quality, CT artifacts

2. Recent methods in CT Imaging:

Helical CT scan: Slip ring technology, Advantages, Multi Detector CT, Cone — Beam geometry, Reconstruction of helical CT images, CT Fluoroscopy, HRCT, Post Processing Techniques: MPR, MIP, Min IP, 3D rendering: SSD and VR, CT Dose

Techniques In CT Scan Imaging :

Patient preparation, Imaging techniques and protocols for various parts of body,

i. CT contrast enhanced protocols
ii. CT angiography:
iii. Aortogram,
iv. Selective angiogram head, neck and peripheral,
v. Image documentation: Filing, Maintenance.

Practicals : Practicals based on theory.

Interventional Procedures and Angiography

I. Principle & Instrumentation:

Digital Subtraction Angiography: Instrumentation, Principle of Digital Subtraction Angiography, Various Digital Subtraction Techniques

II. **Basics Of Invasive Radiology:** Procedure of image guided biopsies and drainage procedure.

III. **Invasive Angiography & Venography** 4 Vessel DSA, Aortogram, Selective Angiogram, Venogram

IV. **Invasive Monitoring** Cardiac resuscitation measures, Management of shock.

V. **Interventional Procedures & Angiography** Stenting, PTA + stenting, stent graft, Embolisation

VI. **Neuro Interventional Procedures** Embolisation, GDC
Glue embolisation
Vertebroplasty

VII. **Adult & Paediatric Invasive Cardiology:** Basics of cardiac catheterization Coronary angiogram

Practicals

VI SEMESTER

Basic & Advanced MRI Imaging Physics :

I. MRI Imaging - Principle:

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

II. Instrumentation:

MR architecture, magnet system and gradient system, patient screening before scanning, Safety aspects, types of magnets and RF coils,

Basic types of pulse sequence and advanced pulse sequences

III. Image Formation:

Fourier transformation, K space imaging, Image formation in MRI, Gating mechanism in MRI. MR artifacts, factors influencing image quality

Techniques in MRI :

I. Protocols: Protocols in MRI for whole Body

II. Advanced MRI techniques:

MR Angiography, (TOF, phase contrast and dynamic contrast MR angiography), Functional MM, MR Spectroscopy, Recent advancement in MRI and open MM, MRCP, DWI, SWI, perfusion etc.

Care of Patients in Diagnostic Radioloay :

Care of the Patient and Fundamentals of Nursing and Medical Emergencies

Unit – 01 :

Introduction To Patient Care:

Clinical Responsibility, Legal Responsibility, Hospital And The Radiographer. General Patient Care:

A. Patient Transfer Technique

B. Turning The Patient (Patient Conditions, Mechanic Safety).

C. Restraint Techniques - Trauma, Paediatric, Geriatric, Physically Handicapped Emotionally Disturbed Patients, Anaesthetised Patient, Moving Chair And Stretcher Patients.

D. Specific Patient Conditions.

Tubes And Catheters, Nasogastric, Chest, Urinary, Intravenous, Oxygen And Other.

(Cast Surgical And Cardiac) Alcoholic, Bed Pans And Urinals.

E. Security Of Patient Properties.

Out Patient, Inpatient.

F. General Comfort And Reassurance For The Patient.

Unit -02

I. Practical Nursing Procedures In Radiology :

Temperature, Pulse, Respiration, B.P., Laying Up A Sterile Trolley, Assisting At An Iv Injection, A Simple Sterile Dressing, 02 Therapy And Resuscitation, Giving A Patient Bed Pan, Giving An Enema, The Catheterized Patient, The Use Of A Sucker.

II. Preparation Of The Patient:

General Abdominal Preparation, Clothing Of The Patient.

Unit -03

I. Sterilization and sterile techniques:

Methods Of Sterilization, Central Sterile Supply, Preparation Of The Hands For Aseptic Procedures.

I. Drugs in the X-Ray department:

Poisons And Dangerous Drugs, Units Of Measurement, Drugs Used In Preparation Of the Patient, Contrast Agents Used In X Ray Examinations, Drugs Used In Resuscitation, Labeling and issuing.

Unit -04

Infection Control :

A. Infections Pathogens, Communicable Disease Nosocomial Infection, Other

B. Isolation Technique: Category, Purpose, Procedure.

C. Infection Sources: Bacteria Virus, Other.

D. Transmission Modes:
Aerobic, Contact, Other.

E. Procedures: Institutional, Departmental

F. Physiological Considerations:

G. The Infection Patient In The X Ray Department. The Infections Patient in the Ward.

Unit -05

Contrast Media:

A. Definitions:
I) Air, Gasses.
II) Radiopaque: Barium Compounds, Aqueous Iodine Compounds, Oily Iodine Compounds, Other.

B. Pharmacology:
Barium Compounds & Iodine Compounds: Patient History/Allergy, Chemical Composition, Patient Precautions, Patient Reactions, Emergency Care.

C. Methods of Administration:
I) Systemic: Oral, Rectal, Tube, Catheter, Inhalation.
II) Parental: Intravenous, Intra-Arterial, Intra Spinal.

D. Administration Technic: Oral (Spoon, Cup, Capsule),Tube/Catheter, Nasogastric, Urinary, Enema, Other.