



Dr.M.G.R.
Educational and Research Institute
(DEEMED TO BE UNIVERSITY)
(An ISO Certified Institution)
University with Graded Autonomy Status
Maduravoyal , Chennai - 600 095



FACULTY OF ALLIED HEALTH SCIENCE

B.Sc. CARDIAC CARE TECHNOLOGY

Regulations, Curriculum and Syllabus

2020



C. B. Palanivelu
REGISTRAR
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Regulations for B.Sc. (Allied Health Science) Courses

Introduction:

B.Sc. (Allied Health Science), a (3-year course work + 1-year internship) program under the **Faculty of Allied Health Sciences**, is aimed at training students who will be able to meticulously assist the doctors for providing quality patient care in selected areas of clinical speciality. This program is a taught course that covers relevant topics and specialized areas of knowledge as opted. The aim of this B.Sc. program is to provide a thorough training to the candidates through formal lectures and/or seminars and practical programs which culminate in a one year internship that finally prepares the student for the rigors of the medical world.

1. Short Title and Commencement:

These Regulations shall be called the “Regulations for B.Sc. (Allied Health Science) Course” of Dr. M.G.R Educational and Research Institute. These regulations shall come into force from the academic year 2020-2021. These regulations are subject to modifications as may be approved by the Academic Council from time to time.

2. Eligibility for Admission:

- a) A candidate desiring to join the (3-year course work + 1-year internship) program, leading to the degree B.Sc. (Allied Health Science) should have passed the HSC/CBSE/ISC or equivalent examination with one of the following subject combinations:
 - i) Physics, Chemistry, Biology (Eligible for all AHS courses)
 - ii) Physics, Chemistry, Botany and Zoology (Eligible for all AHS courses)
 - iii) Physics, Chemistry, Biology, biochemistry(Eligible for all AHS courses)
 - iv) Physics, Chemistry, Biology, nutrition dietetics (for B.Sc., Clinical nutrition only)
 - v) Physics, Chemistry, Mathematics (for B.Optomety only)
- b) A candidate shall, at the time of admission submit to the Head of the Institution, a certificate of medical fitness from an authorized Medical Officer certifying that the candidate is physically fit to undergo the academic course and does not suffer from any disability or contagious disease.

3. Age limit for admission

A candidate should have completed the age of 17 years or would complete the age as on 31stDecember of the year of admission to the B.Sc., Allied Health Science Course.

4. Eligibility Certificate

Candidates, who have passed any qualifying examination other than the Higher Secondary Course examination conducted by the Government of Tamil Nadu, shall obtain an Eligibility Certificate from Dr. M.G.R Educational and Research Institute and produce the same at the time of admission.

5. Registration

A candidate admitted to the course shall register his/her name with the University by submitting the application form for registration, duly filled in along with the prescribed fee, through the Head of the Institution within the stipulated date.

6. Duration of the course

The duration of the B.Sc. (Allied Health Science) Degree Course shall be 3-year course work comprising of 6(six) semesters and one year (semesters 7 & 8) of compulsory internship. The candidate is required to pursue the course on a full time basis, and must complete the course within seven years from the date of provisional registration.

7. Commencement of the Course:

The course shall ordinarily commence by the month of August of the academic year.

8. Curriculum:

The Curriculum and syllabus for the course shall be as specified in the annexure to these regulations which are subject to modifications by the standing Academic Board from time to time.

(i) The first three years of the course will be utilized as follows:

- The first two semesters will be spent on Basic nutrition, Applied Microbiology, Family meal management, Clinical Nutrition, Advanced Nutrition, Physiology, Allied chemistry, Physics, English and Communication skills, Introduction to Computers, and Pharmacology.
- Specialized training in the concerned specialty will be offered during the third, fourth, fifth and sixth semesters.

(ii) The fourth year of the course shall be compulsory internship in the respective specialty.

9. Medium of Instruction:

English shall be the medium of instruction for all the subjects of study and for the examination.

10. Working Days:

Each semester shall consist of not less than 100 working days and each academic year shall have a total of 200 working days or above in the first to Sixth Semesters. In the Seventh and Eighth

semesters, each semester shall have a minimum of 120 working days.

11. Attendance:

The candidate shall have not less than 80% attendance in Theory and Practical separately. Each semester shall be taken as a unit for the purpose of calculating the attendance. The candidate lacking attendance in a subject shall be denied permission to appear for the University Examination in that subject.

12. Condonation of Lack of Attendance:

The discretionary power of condonation of shortage of attendance to appear for University Examination rests with the University.

Lack of attendance can be condoned up to a maximum of 10% of the minimum attendance required in the following exceptional circumstances:

- (i) Any illness/ accident (for which Medical certificate from a registered medical practitioner must be produced)
- (ii) Any unforeseen tragedy in the family (should produce the letter from the parent/guardian)
- (iii) Participation in NCC/NSS and other co-curricular activities representing the Institution / University. (Certificate from competent authority is required)

For any of the above reasons, request shall be made by the candidate with prescribed fees to the Controller of Examination through proper channel, ten days prior to the commencement of the theory examination.

13. Commencement of the examinations

There shall be two sessions of University examinations in an academic year, viz., February and August.

14. Continuous (Internal) Assessment:

Continuous (Internal) Assessment for Theory shall be the average of the best two out of three.

Continuous (Internal) Assessment for Practical shall be the average of the best two out of three.

15. Semester - End Examination (University/Department):

- a. The examination in B.Sc. (Allied Health Science) shall consist of Written Theory examinations and Practical examinations. The Semester - End Examination (University/Department) shall be conducted at the end of each semester.

b. Papers for which Internal Examination is recommended by the Board of Studies and approved by the Academic Council, the date of Semester - End Examinations (Internal examinations) shall be as per the University guidelines.

16. Pattern of Semester - End Examination (University/Department):

EXAMINATION PATTERN-

SEMESTER-I AND SEMESTER-II (FOR ALL SPECIALITIES)

THEORY

MARKS- 60 Marks

DURATION -2¹/₂ Hours

PART –A (Answer any one from Two)

1. Essay (1x15=15 Marks)

PART-B (Answer all questions)

1. Short Notes (5x5=25 Marks)

PART-C (Answer all questions)

1. Short answers (10x2=20 Marks)

PRACTICAL

Practical (including Orals) 15 Marks

CONTINUOUS (INTERNAL) ASSESSMENT

Theory 20 Marks

Practical 5 Marks

TOTAL 100 Marks

Question pattern for SEMESTER III – SEMESTER VI

Duration -3hours

Theory

80 marks

Section –A (Answer any TWO from THREE)

1. Essay (2x15=30)

Section-B (Answer any EIGHT from TEN)

1. Short notes (8x5=40)

Section-C

1. Very short notes (5x2=10)

Internal assessment

Based on CAT Exams (I,II,III& Model)

20 marks

TOTAL

100 Marks

Practicals Pattern

80 marks

- | | |
|------------------------------|----------|
| 1. Spotters | 20 marks |
| 2. Viva (Theory &Practicals) | 20 marks |
| 3. Charts/stations | 20 marks |
| 4. Record | 20 marks |

Internal assessment 20 marks

- Attendance
- Based on CAT exams
- Log book

TOTAL

100 Marks

17. Marks Qualifying for a Pass:

For passing the University/End-Semester Examination from Semester I to Semester VI, the candidate shall secure the marks as stated below,

- 40% minimum in the University End-Semester Theory examination
- 40% minimum in the University End-Semester Practical examination
- 40% of marks in the subject where internal evaluation alone is conducted
- 40% of aggregate of theory, practical and internal assessment taken together

18. Classification of successful candidates:

- a) Successful candidates who secure 75% marks and above as a course aggregate in the first appearance taking University theory, practical, and project/dissertation evaluation shall alone be awarded Distinction. This will also apply for award of University rank.
- b) Successful candidates who secure 60% marks and above as a course aggregate in the University theory, practical, project/dissertation evaluation and viva shall be awarded First Class.
- c) All others who secure 40-59% in gross percentage will be classified to have passed in Second Class.

19. Revaluation of answer papers

There shall be revaluation and retotaling of answer papers of failed candidates. Failed candidates are however, permitted to apply to the University within fifteen days of publication of the results for revaluation and retotaling.

20. Carry- over of failed subjects

- 1) A candidate has to pass in theory and practical examinations separately in each of the paper.
- 2) If the candidate fails either in theory or practical examinations, he/she has to reappear for both (theory and practical)
- 3) The student shall start the Internship training (VII & VIII semester) only after he/she clears all the papers from Semester I to Semester VI.

21. Temporary break of study

- a) A candidate is not normally permitted to temporarily break the study.
- b) If a candidate is continuously absent from the institute for four or more weeks,
 - i) Having notified the Dean/Director/Principal within this period, this absence shall be treated as “Temporary Break of Study”.
 - ii) Without notifying the Dean/Director/Principal, his/her name will be removed from the institute rolls.
- c) If a candidate is compelled to temporarily break the study for valid reasons (such as accident or hospitalization due to prolonged ill health), he/she shall apply for condonation of the break to the Dean/Director/Principal through the Head of the Department.
- d) For condonable break of study:

- i) If the lack of attendance is within condonable limits as per Clause No. 12, the candidate shall be permitted to write the examination for the current semester.
 - ii) If there is non-condonable lack of attendance, the candidate shall rejoin the program at the respective semester as and when it is offered after the break and shall be governed by the rules and regulations in force at the time of rejoining.
- e) The total period for completion of the program reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in Clause No.6 irrespective of the period of break of study in order that he/she may be qualified for the award of the degree.
- f) In any case, a candidate shall be permitted to temporarily break the study only once during the entire duration of the program. The candidate shall forfeit the registration in case of a second break or in case of a non-condonable break of study.
- g) Without prejudice to the above rules, the candidate who has completed the attendance requirement for a semester, but has proceeded on a condonable break of study without appearing for the University Examination, shall be permitted to appear for the examinations without repeating the semester and thereafter continue the subsequent semester.

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SCHEME OF EXAMINATION

SEMESTER – I

TOTAL HOURS : 330

S.No.	Paper	Hours/ Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Anatomy –I(UE)	40 hours	20 hours	20	5	60	15	100
2	Physiology –I(UE)	40 hours	20 hours	20	5	60	15	100
3	Biochemistry –I(UE)	40 hours	20 hours	20	5	60	15	100
4	Microbiology –I(UE)	40 hours	20 hours	20	5	60	15	100
5	Pathology –I(UE)	40 hours	20 hours	20	5	60	15	100
6	English(IE)	30 hours	-	-	-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – II

TOTAL HOURS : 420

S.No.	Paper	Hours / Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Anatomy –II (UE)	40 hours	20 hours	20	5	60	15	100
2	Physiology –II (UE)	40 hours	20 hours	20	5	60	15	100
3	Biochemistry –II (UE)	40 hours	20 hours	20	5	60	15	100
4	Microbiology –II (UE)	40 hours	20 hours	20	5	60	15	100
5	Pathology –II (UE)	40 hours	20 hours	20	5	60	15	100
6	Pharmacology (UE)	40 hours	20 hours	20	5	60	15	100
7	Physics (IE)	30 hours	-		-	50	-	50
8	Computer Science (IE)	30 hours	-		-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – III (CARDIAC CARE TECHNOLOGY)

TOTAL HOURS : 420

S.No	Paper	Hours/ Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Anatomy and Physiology Related to cardiac care technology-Theory(UE)	60 hours	-	20	-	80	-	100
2	Anatomy and Physiology Related to cardiac care technology-Practical (UE)	-	120 hours	-	20	-	80	100
3	Pharmacology related to cardiac care technology - Theory (UE)	60 hours	-	20	-	80	-	100
4	Pharmacology related to cardiac care technology - Practical (UE)	-	120 hours	-	20	-	80	100
5	Medical Ethics and Bio safety(IE)	30 hours	-	-	-	50	-	50
6	Psychology (IE)	30 hours	-	-	-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – IV (CARDIAC CARE TECHNOLOGY)

TOTAL HOURS : 420

S.No	Paper	Hours / Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Pathology related to cardiac care technology paper I– Theory (UE)	60 hours	-	20	-	80	-	100
2	Pathology related to cardiac care technology paper I – Practical (UE)	-	120 hours	-	20	-	80	100
3	Pathology related to cardiac care technology paper II – Theory(UE)	60 hours	-	20	-	80	-	100
4	Pathology related to cardiac care technology paper II – Practical (UE)	-	120 hours	-	20	-	80	100
5	Basic and Advanced Life support(IE)	30 hours	-	-	-	50	-	50
6	Sociology(IE)	30 hours	-	-	-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – V (CARDIAC CARE TECHNOLOGY)

TOTAL HOURS : 450

S.No	Paper	Hours / Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Electrocardiography related to cardiac care technology paper I-Theory (UE)	60 hours	-	20	-	80	-	100
2	Electrocardiography related to cardiac care technology paper I - Practical (UE)	-	120 hours	-	20	-	80	100
3	Electrocardiography related to cardiac care technology paper II -Theory(UE)	60 hours	-	20	-	80	-	100
4	Electrocardiography related to cardiac care technology paper II - Practical (UE)	-	120 hours	-	20	-	80	100
5	Environmental science and Community medicine-Theory (IE)	30 hours	-	-	-	50	-	50
6	Bio-Statistics and Research Methodology (IE)	30 hours	-	-	-	50	-	50
7.	Basic Nutrition (Elective) (IE) /Advanced Diagnostic techniques(Elective) (IE)	30 hours	-	-	-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – VI (CARDIAC CARE TECHNOLOGY)

TOTAL HOURS: 390

S.No	Paper	Hours/ Semester		Evaluation (Marks)				
		Theory	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper I- Theory (UE)	60 hours	-	20	-	80	-	100
2	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper I - Practical (UE)	-	120 hours	-	20	-	80	100
3	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper II- Theory (UE)	60 hours	-	20	-	80	-	100
4	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper 11 - Practical (UE)	-	120 hours	-	20	-	80	100
5	Health care and basic principles (IE)	30 hours	-		-	50	-	50
6	Hospital Management/Applied clinical research(Elective) (IE)	30 hours	-	-	-	50	-	50

UE – University Exam

IE – Internal Exam

SEMESTER – VII (FOR ALL SPECIALITIES)**Project/Dissertation**

S.No	Paper	Hours / Semester		Evaluation (Marks)				Total
		Theory	Practical	Continuous assessment (Internals)		End Semester Examination		
				Project	Viva	Project	Viva	
1.	Project/ Dissertation(UE)	-	-	100	-	100	-	200

SEMESTER – VII & VIII (FOR ALL SPECIALITIES)**Internship -1 year**

SEMESTER - I

S.No:	Subject
1.	Anatomy – I (UE)
2.	Physiology –I (UE)
3.	Biochemistry - I(UE)
4.	Microbiology - I(UE)
5.	Pathology – I(UE)
6.	English (IE)

SEMESTER - I

ANATOMY – I (UE)

Objectives:

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

Learning Objectives: Skills

- Identify the anatomical structure in the dissected specimen.
- Learn to correlate anatomical structures with relevant clinical conditions.

CONTENTS

Unit I

Organization of the Human Body

- Introduction to the human body
- Definition and subdivisions of anatomy
- Anatomical position and terminology
- Regions and Systems of the body
- Cavities of the body and their contents
- Levels of organization of the body

Cell

- Definition of a cell, shapes and sizes of cells
- Parts of a cell – cell membranes cytoplasm, sub cellular organelles and their main function
- Cell Division – Definition and main events that occur in different stages of mitosis and meiosis.

Tissues

- Tissues of the body
- Definition and types of basic tissues
- Characteristics, functions and locations of different types of tissues

Unit II

Systems of Support and Movement

1. Skeletal system

- Skeleton – Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Parts of bones. Functions of bones. Name location and general features of the bones of the body.
- Joints – Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, movements possible.

2. Muscular system

- Parts of the skeletal muscle. Definition of origin and insertion. Name and location of the skeletal muscles of the body. Origin, insertion, nerve supply and action of large muscles like sternocleidomastoid, pectoralis major, deltoid, Biceps brachial, Triceps brachia, gluteus, gastronemius and diaphragm.

Unit III

Control Systems of the Body

1. Nervous system

- Sub-divisions of the nervous system
- **Spinal cord** – Location, extent, spinal segments, external features and internal structure.
- **Brain** – Sub-divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord.
- **Cranial nerves** - Name, number, location and general distribution.
- **Spinal nerves** - Typical spinal nerve groups and number of spinal nerves. Name and location of cervical plexus and brachial plexus. Location and general distribution of the branches.
- **Autonomic Nervous system** –definition and functions

2. Sense organs

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

3. Endocrine system

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

PRACTICAL & VIVA VOICE

1. **Histology** – Epithelium
2. **Axial & Appendicular Skeleton** With Names & Number Of Bones
3. **Muscles**
 - a. Trapezius
 - b. Latissimus dorsi
 - c. Biceps
 - d. Triceps
 - e. Deltoid
4. **Nervous System**
 - a. Cerebrum
 - b. Cerebellum
 - c. Brain Stem
 - d. Spinal Cord
5. **Special Senses**
 - a. Tongue
 - b. Ear
 - c. Skin
 - d. Eye
6. **Viva Voce**
 - a. Radiology – X rays
 - b. Osteology
 - c. Charts
 - d. Models
 - e. Gluteus Muscles

Recommended books:

1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha
2. B D Chaurasia: General human anatomy

References:

1. B D Chaurasia: Regional Anatomy. Vol I, II,III
2. Richard S. Snell: Clinical Anatomy

PHYSIOLOGY-I

Objectives of the course:

At the end of this course the students should be able to:

- Comprehend basic terminologies used in the field of Human Physiology
- Define and describe basic Physiological processes governing the normal functioning of the human body.
- Apply this knowledge in their Allied Health Science practice.

CONTENTS

Unit 1

General Physiology

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

Nerve and muscle

- Nerve structure, classification of nerve fibers,
- Muscles- classification , structure , Neuro-Muscular junction(NMJ).
- Muscle contraction-mechanism, types.

Blood and body fluids

- Body fluid volumes, compartments, and composition
- Blood composition and functions
- Plasma proteins
- Erythrocytes –Morphology and functions
- Leucocytes-Morphology and functions
- Platelets-Morphology and functions
- Blood groups.

Unit II

Digestive system

- Salivary glands -Nerve supply, functions of saliva.
- Gastric juice-composition & functions of gastric juice.

- Pancreatic juice- composition, functions and regulation of pancreatic juice.
- Bile- composition, functions of bile and bile salts.
- Succus entericus and small intestinal movements.
- Deglutition, vomiting, functions of large intestine.

Excretory system

1. Structure of Nephron and its blood supply, Juxtaglomerular Apparatus(JGA).
2. Formation of urine-Filtration, Reabsorption and secretion.
3. Counter-Current mechanism
4. Micturition.

PRACTICAL & VIVA VOICE

- Microscope
- Estimation of Hemoglobin
- RBC
- WBC
- Spotters

Recommended book

1. Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

Reference books

1. Medical physiology for under graduates by Indhu Khurana,
2. Text Book of Physiology by A.K. Jain for BDS.

BIOCHEMISTRY-I (UE)

Objectives:

At the end of this course the students should be able to:

- To have a knowledge about the chemistry and metabolism of various macromolecules- carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

CONTENTS

Unit I - CARBOHYDRATES

Carbohydrates:

- Classification of carbohydrates and their biological importance,
- Reducing property of sugars.

Metabolism of Carbohydrates:

- Digestion and Absorption of carbohydrates,
- Steps of Glycolysis and energetics,
- Steps of TCA cycle and energetics,
- Steps of Glycogen synthesis and breakdown,
- Significance of HMP shunt pathway,
- Definition and steps of Gluconeogenesis, Galactose metabolism
- Galactosemia.
- Diabetes mellitus ,

Bioenergetics :

- Importance of ATP, Outline of respiratory chain.

Unit II - LIPIDS

Lipids:

- Classification of lipids,
- Essential fatty acids,
- Functions of cholesterol,
- Triglycerides,

- Phospholipids

Metabolism of Lipids :

- Digestion and Absorption of lipids,
- Fatty acid synthesis & Steps of β oxidation of fatty acids,
- Types and functions of lipoprotein,
- Lipid profile, hyper cholesterolemia

Unit III - VITAMINS

Vitamins:

- Vitamins, its classification
- Vitamin A
- Vitamin D
- Vitamin E & K
- Vitamin B complex
- Vitamin C

Unit IV - ENZYMES

Enzymes:

- Definition,
- Classification,
- Coenzymes,

Factors affecting enzyme activity, Types and examples of enzyme inhibition

PRACTICAL & VIVA VOICE

1. Reactions of Glucose
2. Reactions of Fructose
3. Reactions of Maltose
4. Reactions of Lactose
5. Tests for Sucrose
6. Tests for Starch
7. Identification of unknown Carbohydrates

SPOTTERS

- **CRYSTALS**

- Maltosazone
- Lactosazone
- Glucosazone/Fructosazone

- **REAGENTS**

- Benedict's reagent
- Barfoeds reagent
- Foulgers reagent
- Seliwanoff reagent
- Fouchets reagent

- **CHEMICALS**

- Sodium Acetate
- Phenyl hydrazine
- α Naphthol

- **STRUCTURES.**

- Structure of Cholesterol
- Structure of Glucose
- Structure of Fructose

- **VITAMINS**

- Carrots
- Rickets
- Scurvy
- Egg

Text books Recommended :

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

Reference books :

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7th Edition
- Harper's Illustrated Biochemistry – 30th Edition.

MICROBIOLOGY – I (UE)

OBJECTIVE:

At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them.

Contents

Unit I:

General Microbiology-History and Introduction of Microbiology, Microscopy and Morphology of bacterial cell and their function, Growth and nutrition of Bacteria, Sterilization and Disinfection , Culture media, Culture methods and Identification of bacteria.

Unit II:

Immunology-Basic concept about Infection (Source, Portal of entry and Spread), Immunity, Antigen, Antibody, Antigen-Antibody reaction, Hypersensitivity.

Unit III

Systemic bacteriology- Disease caused and lab diagnosis of medically important bacteria (Staphylococcus, Streptococcus, Neisseria, Echerichia coli, Salmonella, Shigella, Vibrio, Mycobacteria, Spirochetes)

PRACTICAL & VIVA VOICE

1. Gram staining

2. Spotters:

- Disposable syringe
- Sterile cotton swab
- Bacteriological loop
- Sterile tube
- McIntosh fildes Jar

- Autoclave
- Nutrient Agar plate
- Mac Conkey agar plate
- Mac conkey with LF
- Mac conkey with NLF
- Blood agar plate
- L J Media
- RCM
- BHI broth
- Antibiotic susceptibility test
- Gram Positive Cocci in Clusters
- Gram negative bacilli
- AFB
- VDRL Slide
- Microtitre plate

RECOMMENDED BOOK:

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

REFERENCE BOOKS:

1. Ananthanaryanan and Paniker's - Textbook of Microbiology.
2. Subhash Chandra Parija – Textbook of Microbiology.

PRACTICAL BOOK:

1. Patwardhan,Bhat,Satish Patwardhan – Handbook of Practical examination in Microbiolog

PATHOLOGY-I (UE)

Objective:

At the end of the semester the students should be able to

- To develop better understanding of pathological conditions and their causes.
- To develop knowledge on the diseases of major organs and structures.

Contents

Unit-I. Introduction to cell

- Normal Cell Structure Function

Unit-II.Cell injury and Adaptation

- Causes and Types of Cell Injury
- Cellular Adaptations- (Hypertrophy, Hyperplasia, Atrophy, Metaplasia)
- Necrosis-Definition, Causes, Types with Examples, Morphology
- Apoptosis-Definition, Causes, Morphology
- Pathological Calcification

Unit-III.Inflammation and Repair

- Inflammation-Definition, Types, Cardinal signs
- Acute Inflammation-Vascular events and Cellular events(ONLY NAMES) , Outcomes of Acute inflammation, Morphological types of Acute inflammation(ONLY NAMES), Chemical Mediators(ONLY NAMES)
- Chronic Inflammation- Causes and Granulomatous inflammation
- Wound Healing and Repair- Definition, Steps in wound healing, Factor influencing wound healing, Complications of wound healing(ONLY NAMES)

Unit-IV.Hemodynamic Disorder

- Edema- Definition, Causes and Pathogenesis
- Thrombosis-Definition, Causes and Fate of thrombus
- Embolism-Definition and Types
- Infarction-Definition and Classification
- Shock-Definition, Stages, Types of Shock, Etiopathogenesis of Septic shock

Unit-V.Infectious Disease

- Tuberculosis-Etiology, predisposing factors, primary & secondary tuberculosis and complications
- Leprosy-Etiology, classification, Lepromatous and tuberculoid leprosy

Unit-VI.Neoplasia

- Definition, Nomenclature & Classification
- Characteristics of Benign and Malignant neoplasms,
- Pathogenesis of Cancer(Only Names of Carcinogenic agents)
- Spread of Cancer(Metastasis and Pathways of spread)

Unit-VII.Genetics

- Down syndrome
- Klinefelter syndrome
- Turner syndrome

Unit-VIII. Radiation

- Effects of Radiation

PRACTICAL & VIVA VOICE

• DIFFERENTIAL COUNT

- Spotter

• GROSS (SPOTTER)

- Fatty liver
- Lipoma
- Dry gangrene foot
- Wet gangrene bowel
- CVC Spleen
- Hydatid cyst
- TB – Lung

• INSTRUMENTS

- Westergrens ESR tube
- Sahli hemocytometer
- Neubauer's chamber
- Bone Marrow Needle

Recommended Textbook:

1. Textbook of Pathology ,Harsh Mohan,3rd edition

Reference book:

1. Harsh Mohan,3rd edition – Text book of Pathology
2. Dr. Ramdas Nayak, Publisher: Jaypee - Text book of Pathology

ENGLISH (IE)

General objectives:

At the end of the semester the students should be able to

- To improve comprehensive and writing skills in English
- To discuss about effective communication skills
- To prevent barriers in communication.

Unit I: Grammar

- Components of a sentence
- Positive and Negative statements
- Interrogative Statement
- Parts of speech in brief
- Transformation and synthesis of sentences
- Verb and Tense forms
- Voice
- Reported Speech
- Common errors and how to avoid them

Unit II. Vocabulary

- Medical Terminology
- Words often confused or misused
- Words and expression in British and American English
- Idioms and Phrases

Unit III. Oral communication

- Importance of speaking efficiently
- Voice culture
- Preparation of Speech
- Secrets of good delivery
- Audience Psychology
- Presentation Skills
- Using non-verbal communication
- Interview technique
- Skill in arguing

Unit IV. Spoken English

- The phonetic symbols
- Stress
- Intonation
- Rhythm
- Transcription
- Using dictionaries for learning to pronounce

Unit V. Written communication

(a) Art of writing

- Rules for effective writing
- Expansion of proverbs & Ideas
- Précis writing

(b) Letter writing

- Private letters & Social letters
- Business letters
- Letter to a Bank
- Letter to a Newspaper
- Letter to Application
- Curriculum Vitae (Different models)
- Placing an order

(c) Report writing

- Guidelines to prepare a good report
- Usage of impersonal language
- Preparing lab reports

(d) Note making and Note taking

- Note making and note taking strategies
- Organizing notes
- Exercise and note making / taking

(e) Comprehension

- Listening and reading comprehension
(Exercise of prescribed short answers)

Unit VI. Reading

- What is efficient and fast reading?
- Awareness of existing reading habits
- Tested techniques for improving speed
- Improving concentration and comprehension through systematic study.

Reference Books:

1. English for Competitive Examinations by R.P.Bhatnagar, Rajiel Bhargava
2. English for college and competitive exams by Dyvadatham
3. Written Communication in English by Sarah Freeman
4. Writing with a purpose by Tickoo & Sasikumar
5. English phonetics for Beginners by P.Iyadurai
7. Empowerment through verbs & idioms by Padmini devkumar
8. High School English Grammar and Composition by Wren & Martin
9. Communication techniques for your success everywhere by Muralidharan.

SEMESTER-II

S.No:	Subject
1.	Anatomy – II (UE)
2.	Physiology –II (UE)
3.	Biochemistry – II (UE)
4	Microbiology – II (UE)
5.	Pathology – II (UE)
6.	Pharmacology (UE)
7.	Physics (IE)
8.	Computer science (IE)

SEMESTER II
ANATOMY – II (UE)

Objectives:

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

Unit I

Maintenance of the Human Body

a) Cardio-vascular system

- Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall, conducting system of the heart.
- Blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of principal arteries and veins.

b) Lymphatic system

- Lymph, lymphatic vessels, name, location and features of the lymphatic organs.

c) Respiratory system

- Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

Unit II

a) Digestive system

- Names of organs of digestion. Parts of alimentary canal and accessory organs. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder.

b) Urinary system

- Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra.

Unit III

a) Reproductive system

- Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus and its supports, uterine tube, ovary, vagina, vulva and breast.

b) Anatomical Regions

- Simple ideas about scalp, triangles of neck, axilla, cubital fossa, mediastinum, inguinal canal, femoral triangle, popliteal fossa.

PRACTICAL & VIVA VOICE SYLLABUS

• Endocrine System

- Pituitary gland
- Pineal body
- Thyroid & parathyroid gland
- Adrenal
- Pancreas
- Gonads – Ovary & Testis

• Cardio-Vascular System

- Heart

• Lymphatic system

- Spleen

• Respiratory System

- Lungs
- Larynx
- Trachea

• Digestive System

- Salivary glands
- Esophagus
- Pharynx
- Stomach
- Liver, Gall bladder

- Duodenum
- Small intestine
- Large intestine
- **Urinary system**
 - Kidneys
 - Ureter
 - Urinary bladder
- **Reproductive System**
 - Sagittal section – Male & Female pelvis
 - Uterus & ligaments
 - Ovary
 - Prostate
 - Seminal vesicles
 - Vas deferens
 - Testis
- **Viva Voce**
 - Radiology – Xrays
 - Osteology
 - Charts
 - Models

Recommended books:

1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha.
2. B D Chaurasia: General human anatomy.

References:

1. B D Chaurasia: Regional Anatomy. Vol I, II,III.
2. Richard S. Snell: Clinica

PHYSIOLOGY-II (UE)

Objectives:

- To develop vocabulary for appropriate terminologies to effectively communicate terms related to physiology of various body systems
- To identify and describe physiological functions of various structures involved in smooth functioning of the body.

Unit I Cardiovascular System

- Cardiac muscle, action potential and conducting system of the heart.
- Cardiac cycle.
- ECG, heart sounds, Heart Rate.
- Cardiac output-Definition, factors regulating cardiac output and measurement of cardiac output.
- Blood pressure-Definition, measurement, factors maintaining BP.
- Regional circulation-Coronary and cerebral.

Unit -II Nervous system

- Structure & Properties of Neuron.
- Nerve- Classification, injury.
- Types and properties of Receptors
- Synapse and synaptic transmission.
- Reflex and its properties.
- Spinal cord-Ascending & Descending tracts.
- Thalamus, Basal ganglia, Cerebellum, Cerebral cortex, Hypothalamus & Cerebrospinal fluid.
- Autonomic nervous system.
- Ascending and descending tracts.

Unit -III Respiratory system

- Structure of upper and lower respiratory tract. Muscles of respiration and Mechanism of respiration.
- Lung volumes and capacities-definition, normal values, intrapulmonary and intra pleural pressures, surfactant.
- Oxygen transport, carbon-dioxide transport.
- Neural and chemical regulation of respiration.
- Hypoxia, cyanosis, Artificial Respiration.

Unit – IV Special sense and skin

- Vision,
- Audition,
- Olfaction,
- Gustation.

Unit – V Reproductive system

- Male reproductive organs-Spermatogenesis and testosterone actions.
- Female reproductive organs.
- Contraception Methods.

Unit – VI Endocrine system

- Hypothalamus hypophyseal inter relationship.
- Anterior pituitary hormones and their functions.
- Posterior pituitary hormones and their actions.
- Thyroid hormones, biosynthesis and functions.
- Parathyroid hormones ,functions.
- Insulin, glucagons, actions and Diabetes mellitus.
- Adrenal cortex hormones and their functions.
- Adrenal medullary hormones and their actions

PRACTICAL & VIVA VOICE SYLLABUS

1. WBC.
2. Blood pressure.
3. Bleeding time
4. Clotting time.
5. Charts and spotters.

Recommended book

- Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

Reference books

- Medical physiology for under graduates by Indhu Khurana,
- Text Book of Physiology by A.K. Jain for BDS.

BIOCHEMISTRY – II (UE)

Objectives:

At the end of the semester the students should be able

- To have a knowledge about the chemistry and metabolism of proteins
- To learn about nutrition-balanced diet and malnutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

Unit I - PROTEINS

Proteins :

- Classification of amino acids,
- Structure of proteins,
- Plasma proteins,
- Immunoglobulins.

Metabolism of Proteins :

- Digestion and absorption of proteins,
- Transamination,
- Deamination,
- Steps of urea cycle,
- Phenyl ketonuria,
- Alkaptonuria,
- Transmethylation,
- Products derived from Glycine and tyrosine

Unit II -- NUCLEIC ACIDS

Nucleic acids:

- Structure & Function of DNA,
- Structure, Its types & Functions of RNA
- Nucleic Acid Metabolism

Unit III - HAEMOGLOBIN

Haemoglobin:

- Structure & Function of Haemoglobin
- Haemoglobin Metabolism

Unit IV-- MINERALS

Minerals:

- Macro & Minor Minerals & Metabolism

Unit V -- NUTRITION

Nutrition:

- BMR, SDA & Glycemic Index
- Dietary Fibers & Balanced Diet
- Protein Energy Malnutrition

Unit VI -- ORGAN FUNCTION TEST

- RFT

Unit XI - ACID BASE BALANCE

Acid Base Balance:

- pH Homeostasis
- Buffers
- Buffers
- Acidosis
- Alkalosis

PRACTICAL & VIVA VOICE

- Non- Protein Nitrogenous Substances
- Analysis Constituents of normal urine
- Analysis Constituents of abnormal urine
- Identification of abnormal constituents in urine
- Estimation of Glucose in blood
- Estimation of Urea in blood.

Spotters

Spotters: The student must identify the spotter and write some important uses of the spotter.

1. Urinometer
2. Lactometer
3. Centrifuge
4. Spectroscope
5. Colorimeter
6. pH meter
7. Ryles' Tube
8. Chromatography apparatus
9. Electrophoresis apparatus
10. Micropipette
11. Fluorosis
12. Inborn Errors of Metabolism
13. Protein Energy Malnutrition
14. Benzidine powder
15. Sulphur powder
16. Fouchet's Reagent
17. Structure of t RNA
18. Egg White
19. Jaundice
20. Gout

Text books Recommended:

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

Reference books:

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7th Edition
- Harper's Illustrated Biochemistry – 30th Edition.

MICROBIOLOGY – II (UE)

OBJECTIVE:

At the end of the semester the students should be able to

- Explain general and specific mechanisms by which an infectious agent like viruses, fungi and parasites causing diseases.
- Explain interventions employed to prevent infectious diseases including infection control measures and vaccines.

Unit-I

Virology: Introduction to virology, List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio) and Lab diagnosis of viral infections

Unit - II

Mycology: Introduction to Mycology, List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis) and Lab diagnosis of fungal infections.

Unit - III

Parasitology: Introduction to Parasitology, List of medically important parasites and diseases (E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma) and Lab diagnosis of parasitic infections

Unit - IV

Applied Microbiology-Collection and transport of clinical specimen, Sexually transmitted disease, Hospital acquired infection, Urinary tract infection, Skin and Soft tissue infection, Anaerobic infection, Respiratory tract infection and Bloodstream infection, Immunoprophylaxis, Biomedical Waste Management and standard precautions.

PRACTICAL & VIVA VOICE

I.SPOTTERS

1. Ascaris lumbricoides
2. Taenia
3. Gram stained smears showing Candida
4. Universal container
5. Vaccine-OPV
6. BCG

7. Hepatitis
8. DPT
9. TT
10. MMR
11. Virology –Embryonated egg
12. Tissue culture
13. Rhabdovirus
14. Polio virus
15. HIV

II. Clinical case discussion with charts

1. Skin and soft tissue infections
2. Ring worm/ Tinea infections
3. Food poisoning
4. Gastroenteritis

RECOMMENDED BOOK:

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

REFERENCE BOOKS:

1. Ananthanaryanan and Paniker's - Textbook of Microbiology.
2. Dr.C.P.Baveja – Textbook of Microbiology.

PRACTICAL BOOK:

1. Patwardhan, Bhat, SatishPatwardhan – Handbook of Practical examination in Microbiology.

PATHOLOGY- II (UE)

UNIT-1: CARDIOVASCULAR SYSTEM

- Ischemic Heart Disease
- Myocardial Infarction-Definition, Etiopathogenesis and Morphology
- Valvular Heart Disease
- Rheumatic Heart Disease- Definition, Etiopathogenesis and Morphology
- Infective Endocarditis- Definition , Etiopathogenesis and Morphology
- Congenital Heart Diseases- Only Names
- Hypertension- Definition, causes, Morphology and Complications
- Atherosclerosis- Definition, Etiopathogenesis, Morphology and Complications

UNIT-2: RESPIRATORY SYSTEM

- Pneumonia- Definition, Etiopathogenesis and Morphology
- COPD-(Emphysema, Chronic Bronchitis, Bronchial Asthma) - Definition, Etiopathogenesis and Morphology
- Bronchiectasis- Definition, Etiopathogenesis and Morphology

UNIT-3: GASTROINTESTINAL SYSTEM

- Gastritis and Peptic ulcer disease- Definition, Etiopathogenesis, Morphology and Complications
- Tumors of GIT
- Gastric carcinoma-Etiology and Morphology

UNIT-4: HEPATOBILIARY SYSTEM

- Liver Abscess
- Amoebic liver abscess
- Alcoholic Liver Disease and Liver Cirrhosis- Definition, Etiopathogenesis , Morphology and Complications, Jaundice- Definition, Pathophysiology, Types and Causes
- Viral Hepatitis- Definition, Etiology and Morphology
- Cholecystitis

UNIT-5: RENAL AND URINARY SYSTEM

- Renal Calculus- Etiology, Types and Complications
- UTI and Pyelonephritis – Causes, Etiopathogenesis , Morphology and Complications

- Renal Cell Carcinoma- Causes and Names of Tumors
- Renal Failure
- Acute Glomerulonephritis/Nephritic syndrome and Nephrotic syndrome- Definition, Causes, Clinical Presentation and Complications

UNIT-6: REPRODUCTIVE SYSTEM

- Diseases of Testis, Uterus, Cervix, Ovary- Only Names

UNIT-7: CENTRAL NERVOUS SYSTEM

- Infection
- Meningitis- Definition, Causes and CSF Findings

UNIT-8: DISEASES OF BONES & JOINTS

- Septic Arthritis
- Osteomyelitis-Definition, Causes, Morphology and Complications
- Rheumatoid Arthritis- Definition, Etiopathogenesis and Morphology
- Bone Tumors- Only Names

UNIT-9: ANEMIA

- Anemia- Definition, Classification
- Iron deficiency and Megaloblastic Anemia- Etiology and Morphology

UNIT-10: AUTOIMMUNE DISEASES

- Definition and Names of common autoimmune diseases

PRACTICAL & VIVA VOICE

INSTRUMENT TEST

- RBC Pipette
- WBC Pipette
- Sahli's Pipette
- Wintrobe's PCV tube
- Hb Estimation
- Blood grouping

SPECIMEN

- Chronic Pyelonephritis
- RCC
- SCC – Foot
- Leiomyoma – Fibroid uterus
- Gall stones
- Appendicitis
- Liver abscess

Recommended Textbook:

1. Textbook of Pathology ,Harsh Mohan,3rd edition

Reference book:

1. Harsh Mohan,3rd edition – Text book of Pathology
2. Dr. Ramddas Nayak, Publisher: Jaypee - Text book of Pathology
Dr.Ramddas Nayak, Publisher: Jaypee – Text book of Pathology and Genetics

PHARMACOLOGY (UE)

COURSE OBJECTIVES:

- To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic involved in the use of drugs.
- To understand the pharmacological action and mechanism of action of common drugs used for different disease conditions.
- To know the therapeutic uses and adverse effects of common drugs used for different disease conditions

Unit I: Introduction

- General pharmacological principles-Definition-Routes of drug administration-Pharmacokinetics-
- Pharmacodynamics-Adverse drug effects
- Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system

Unit II

- General considerations-Cholinergic system & drugs-Anticholinergic drugs-Adrenergic drugs-antiadrenergic drugs-Drugs acting on autonomic ganglia.

Unit III:

- Skeletal muscle relaxants-Local anaesthetics, General anaesthetics-Ethyl & Methyl alcohol-Sedatives-Hypnotics-Antiepileptics - Antiparkinsonian drugs-Drugs used in mental illness-Opioid analgesics and Non opioid Analgesics - Nonsteroidal Anti-inflammatory drugs

Unit IV

- Cardiovascular drugs , Drugs affecting Blood & Blood formation and Drugs on Respiratory system
- Cardiac glycosides,Antiarrhythmic drugs, Antianginal drugs,Antihypertensives and Diuretics,Haematinics,Erythropoietin,,Drugs affecting-coagulation,Fibrinolytic and Antiplatelet drugs,Treatment of cough and antiasthmatic drugs.

Unit V

- Antimicrobial drugs

- General consideration-Antibiotics-Antibacterial agents-Antitubercular drugs-Antifungal-Antileprotic-Antiviral-Antimalarial-Antiamoebic-Antiprotozoal drugs-Cancer Chemotherapy, Antiseptic-Disinfectant-others.

Unit VI

- Hormones & related Drugs, Drugs used in Gastrointestinal diseases & Miscellaneous drugs
- Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer
- Vitamins, Vaccines, Sera and chelating agents.

Recommended books:

1. Prep Manual for Undergraduates in Pharmacology by Tara V Shanbag, 2nd edition
2. Pharmacology for Dental and Allied Health Sciences by Padmaja Udaykumar, 3rd edition

Reference books:

1. Essentials of Medical Pharmacology by KD Tripathi, 7th edition
2. Basic and Clinical Pharmacology by Bertram G Katzung, 12th edition

PRACTICAL & VIVA VOICE

Learning Objective

This module is intended to discuss the various modalities of drug delivery and instruments relevant to it.

- Instruments
- Needles
 - Intravenous
 - Intrathecal
 - Spinal
 - Intra arterial
- Syringes:
 - Tuberculin
 - Insulin
 - I.V cannula
 - Scalp. Vein set
- Students Discussion
 - Enema can
 - Inhalers

- Spacers
- Nebulizers
- Tablets –
 - Enteric coated,
 - Sustained release,
 - Sub-lingual
- Students Discussion
 - Capsules
 - Spansules
 - Pessary
 - Suppository
 - Topical Preparation
 - Ointment,
 - Lotion,
 - Powder,
 - Drops – eye / ear
- Charts:
 - Mechanism of action of drugs, adverse effects, toxicology
- Spotters:
 - drugs

Text books suggested for reading:

- Text book of pharmacology for Dental & Allied Health Science 2nd edition Padmaja Udaykumar
- Pharmacology for dental students Tara V shanbhag, Smita Shenoy, Veena Nayak
- Principles of pharmacology 2nd edition H.L.Sharma & KK Sharma

PHYSICS (IE)

Unit 1: Basic concepts

Basic Units, Heat, Acoustics etc. Basic concepts of power, work, force, energy Einstein's formula Electronics, Electricity & Magnetism, electromagnetic waves Units and measurements temperature and heat SI units of above parameters Atomic structure Nucleus Atomic Number, Mass Number electron orbit and energy levels Periodic table Isotopes Isobars Ionization and excitation Radioactivity, Natural and artificial radioactivity alpha decay beta decay.

Unit 2: Electromagnetic induction

Electric charges electric induction electric potential capacitance and capacitors. Electrical energy and power unit of current resistance and Ohm's law circuit laws heating effect of current sources of electrical energy E.M.F. Magnetism, Magnetic effect of an electric current application of magnetic field. Electromagnetic induction, laws of mutual induction and self-induction. Alternating current transformers theory and losses practical aspects reactance –resonance impedance and power factors.

Unit 3: Laser

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

Unit 4: Radiation Physics

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

Unit 5: Introduction to Imaging Technique

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

Unit 6: Semiconductor devices

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

Unit 7: Biopotential Recording Systems

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

Recommended books:

1. New Understanding physics for advanced level-JimBreithaupt.
2. Advanced Physics for you by Keith Johnson, Simmon shewett, Sueholt,Johnmiller
3. Christensen's Physics of diagnostic Radiology by Thaomas S.CurryIII, M.D., Robert C Murry, Jr. PhD., Dow Dey, PhD.
4. Applied Electronics, A. Subramanyam, The National Publishing co., Madras(1996).

Computer Science (IE)

Unit-I. History of computers,

- Definition of computers, Input devices, Output devices, Storage devices, Types of memory and units of measurement, Range of computers, Generations of computers, Characteristics of computers

Unit-II. System:

- Hardware, Software, system definition, Fundamentals of Networking, Internet, Performing searches and working with search engines, types of software and its applications

Unit-III. Office application suite

- Word processor, spreadsheet, presentations, other utility tools, Fundamentals of Linux / Windows operating system, functions, interfaces, basic commands, working with the shell and other standard utilities.

Unit-IV. Language

- Comparison chart of conventional language, Programming Languages, Generations Of Programming Languages, Compilers and Interpreters, Universal programming constructs based on SDLC, Variable, constant, identifiers, functions, procedures, if while, do – while, for and other Structures. Programming in C language, Data types, identifiers, functions and its types, arrays, union, structures and pointers

Unit-V. Introduction to object oriented programming with C++:

- Classes, Objects, Inheritance Polymorphism and Encapsulation. Introduction to databases, and query languages, Introduction to Bioinformatics.

Practicals:

1. Various browsers, search engines, email
2. Text document with images with multiple formatting options using a specified office package
3. Spreadsheet using a specified office package
4. Presentation on a specified topic using the specified locations
5. Shell programming-parameters
6. Shell program- regular expressions
7. C program- functions
8. C program – file handling

9. C program demonstrating the usage of user defined variables
10. Databases
11. Applications in allied health sciences

Text Books:

1. Peter Norton., Introduction to Computers. 7th Edition, Tata McGraw Hill Education Private Limited 2010.
2. Gary B. Shelly, Thomas J. Cashman, Misty E. Vermaat., Microsoft Office 2007. 1st Edition, Delmar Cengage Learning 2010

Reference Books:

1. C programming tutorial (K&R version 4) Author(s) Mark Burgess
2. Red hat Linux 9 bible by Christopher Negus May 2003

SEMESTER II

S.NO	SUBJECT
1.	Anatomy and Physiology Related to cardiac care technology- Theory(UE)
2.	Anatomy and Physiology Related to cardiac care technology- Practical (UE)
3.	Pharmacology related to cardiac care technology - Theory (UE)
4.	Pharmacology related to cardiac care technology - Practical (UE)
5.	Medical Ethics and Bio safety(IE)
6.	Psychology (IE)

SEMESTER III

ANATOMY AND PHYSIOLOGY RELATED TO CARDIAC CARE TECHNOLOGY- THEORY (UE)

Course description:

- This course will provide an outline of Anatomy and physiology to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Objectives:

- At the end of the course the students should be able to:
- Describe the structure of the cardiovascular system of the human body.
- Define and describe basic physiological process governing the normal functioning of the human heart.

Learning objective skills:

- Identify the anatomical structure of the human heart.
- Learn to correlate the physiological functions.

UNIT- I:

- Anatomy of the heart and great vessels

UNIT II:

- Gross anatomy and structural features of cardiac chambers
 - Atrium
 - Ventricle
 - AV junction
 - Heart valves
 - Specialized conduction tissues
- Conduction system
 - Sinus node
 - Internodal tracts
 - AV node
 - Bundle of His
- Systemic circulation
 - Arterial system
 - Venous system
 - Lymphatic system
 - Tissue perfusion and microcirculation
- Pulmonary circulation
 - Pulmonary artery
 - Pulmonary veins
 - Bronchial artery
- Cerebral circulation
- Renal circulation

UNIT- III:

1. Innervations of the heart
 - Sympathetic
 - Parasympathetic
 - Sensory
2. coronary vascular system
 - Coronary arteries
 - Myocardial capillary bed
 - Venous drainage
 - Lymphatic drainage
3. Pericardium
4. Cardiac cycle
 - Mechanical events
 - Heart sounds
5. Cardiac output
 - Assessment of cardiac output
 - Ficks principle
 - Thermal dilution and indicator dilution methods

UNIT-IV:

- Anatomy of Respiratory System
 - Mechanism of respiration
 - Principles of gas exchange regulation for respiration
- Cardiac excitation and contraction
 - Mechanism of contraction
 - Nodal electricity

UNIT-V:

Cardiovascular responses in pathological situations

- Shock and hemorrhage
- Syncope
- Essential hypertension
- Chronic cardiac failure

UNIT-VI:

Hematology and coagulation physiology of blood components

- Blood groups
- Blood transfusion
- Hemostasis

RECOMMENDED BOOKS:

ANATOMY:

1. B D Chaurasia: General human anatomy
2. Richard S.Snell: clinical anatomy, Manipal manual for Allied Health Science

PHYSIOLOGY:

1. Essentials of medical physiology, K. Sembulingam, Prema Sembulingam
2. Basics of medical physiology, D. Venkatesh, H.H. Sudhakar
3. Guyton and Hall Textbook of medical physiology, John E. Hall

ANATOMY AND PHYSIOLOGY RELATED TO CARDIAC CARE TECHNOLOGY- PRACTICAL (UE)

Learning objective:

- Expected to describe the structure of the cardiovascular system of the human body.
- Define and describe basic physiological process governing the normal functioning of the human heart.
- To know the pharmacological actions and mechanism of action of cardiovascular drugs used for different disease conditions.

ANATOMY & PHYSIOLOGY:

Charts and Spotters:

- Structural picture of the heart.
- Heart valves
- Conduction system
- Coronary arteries
- Pericardium
- Systemic & pulmonary circulation
- Cardiac cycle
- Cardiac excitation & contraction
- Cardiac output
- Anatomy of respiration

SPECIFIC LEARNING OUTCOME (SLO):

- To gain knowledge on anatomical structures, physiological functions related to the cardiovascular system.

PHARMACOLOGY RELATED TO CARDIAC CARE TECHNOLOGY- THEORY (UE)

Course description:

- This course will provide an outline of pharmacology to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Objectives:

- At the end of the course the students should be able to:
- Define and describe basic physiological process governing the normal functioning of the human heart.
- To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic involved in the use of cardiovascular drugs.
- To understand the pharmacological actions and mechanism of action of cardiovascular drugs used for different disease conditions.

Learning objective skills:

- To know the therapeutic uses and adverse of the cardiovascular drugs used for different disease conditions.

UNIT-I:

- **Anti Anginal Agents**
 - Beta blocking agents – propranolol, Atenolol, Metoprolol, Labetolol, Pindolol.
 - Nitrates – Nitroglycerine ,Isosorbidedinitrate, Isosorbide mononitrate, transdermal nitrate patches.
 - Calcium Channel blockers – Nifedipine , Verapamil , diltiazem , new calcium channel blockers.

UNIT II:

- **Anti Failure Agents**
 - Diuretics – Furosemide, Thiazide diuretics, other thiazide like agents, Potassium sparing diuretics, combination diuretics, special diuretic problems.
 - Angiotensin converting enzyme (ACE) inhibitors
 - Types of ACE inhibitors – Captopril, Enalapril, ACE inhibitors for diabetics and hypertensive renal disease.
 - Digitalis and acute inotropes – Digoxin ,Digitoxin, Dobutamine, Dopamine , Adrenaline, Nonadrenaline , Isoprenaline, Mixed inotropic vasodilators amrinon.

UNIT III:

- **Anti hypertensive drugs**
 - Diuretics, beta blockers, Ace inhibitors, calcium antagonists, direct vasodilators, centrally active and peripherally active vasodilators.

UNIT IV:

- **Anti arrhythmic agents**
 - Quinidine and related compounds, procainamide, lidocaine, mexiletine, phenytoin, flecainide, amiodarone, bretylium, combination therapy.

UNIT V:

- **Antithrombotic agents**
 - Platelet inhibitors
 - Aspirin
 - Persantine
 - Anticoagulants
 - Heparin
 - Warfarin
 - Fibrinolytics
 - Streptokinase
 - Urokinase
 - Combination therapy

UNIT IV

- Lipid lowering and anti atherosclerotic drugs
- Miscellaneous drugs
 - Protamine
 - Emergency drugs
 - Narcotics
 - Sedatives
 - Antihistamines
 - Antibiotics

RECOMMENDED BOOKS:

PHARMACOLOGY:

1. Essentials of medical pharmacology, KD Tripathi
2. Basic and clinical pharmacology, Bertran G Katzung
3. Pharmacology for dental and allied health science, Padmaja Udhayakumar

PHARMACOLOGY RELATED TO CARDIAC CARE TECHNOLOGY- PRACTICAL (UE)

Learning objective:

- Expected to describe the drugs used in the cardiovascular system of the human body.
- Define and describe basic physiological process governing the normal functioning of the human heart.
- To know the pharmacological actions and mechanism of action of cardiovascular drugs used for different disease conditions.

Charts:

- Mechanism of action of drugs and its adverse effect
- Anti Anginal Agents
- Anti Failure Agents
- Anti hypertensive drugs
- Anti arrhythmic agents
- Antithrombotic agents
- Lipid lowering and anti atherosclerotic drugs
- Miscellaneous drugs

Spotters:

- Cardiovascular drugs
- Diuretics
- Angiotensin converting enzyme (ACE) inhibitors
- Digitalis and acute ionotropes
- beta blocking agents
- Nitrates
- Calcium Channel blockers

SPECIFIC LEARNING OUTCOME(SLO):

- To gain knowledge on pharmacological functions, mechanism of action related to the cardiovascular system.

MEDICAL ETHICS AND BIO SAFETY(IE)

UNIT-I

Definition and key Concepts; philosophical considerations; epistemology of science; ethical terms; principles and theories; relevance to health care; ethics and the law issues: genetic engineering, stem cells, cloning, medical techniques, trans-humanism, bio-weapons.

UNIT-II

Define negligence, malpractice & liability; iatrogenic harm; Influence of ethics in general practice; Describe primary and secondary ethical principles; Hippocrates' oath; Professional codes of ethics; Describe the moral basis of informed consent and advance directives; research ethics – animal rights, ethics of human cloning, and stem cell research; ICMR guidelines.

UNIT-III

Genetic testing, genetic screening, Fertility and birth control, sex determination and sex selection, Reproductive control: assisted reproduction and ethics, pre-natal genetic counseling, pre-implantation genetic diagnosis, Ethical issues in applied medicine; Workers compensation.

UNIT-IV

Euthanasia and physician-assisted dying; end-of-life care; Physicians, patients and other: autonomy, truth telling & confidentiality; emerging issues: impact of medical advances on society; Use of genetic evidence in civil and criminal court cases; Challenges to public policy – to regulate or not to regulate; improving public understanding to correct misconceptions.

UNIT-V

Introduction to Biosafety; biological safety cabinets; containment of biohazard; precautions for medical workers; precautions in patient care; Biosafety levels of microorganisms; mitigation of antibiotic resistance; radiological safety; measurement of radiation; guidelines for limiting radiation exposure; maximum reasonable dose; precautions against contamination; Institutional Biosafety committee.

TEXT BOOKS:

1. Medical Ethics - CM Francis 2e, Jaypee publishers, India (2004)
2. Medical Law, ethics, and bioethics - M Lewis and C Tampo, 4e. FA Davis publishers (1998)
3. Biomedical ethics - Terry O' Neill, Greenhaven Press (1999)

REFERENCE BOOKS:

1. Human factor, a bridge between care and cure, eds. R Tartaglia, S Bagnaro et al. Taylor and Francis(2005)
2. Medical Ethics - Robert Snedden, Steck-Vaughn Publishers, Texas, USA (2000)

PSYCHOLOGY (IE)

UNIT 1: Basic Concepts of Psychology

Definition of Psychology, Origin of Psychology - Philosophical roots of psychology, Schools of Psychology –Structuralism – Gestalt – Functionalism – Behaviorism - Psychoanalysis – Humanistic. Fields of Psychology - Work of a psychologist – Applications of psychology.

UNIT 2: Learning principles and methods

Definition of learning, Factors In The Process of Learning Classical conditioning - Operant Conditioning – The principle of reinforcement and Punishment. Theory of learning.Cognitive learning- Latent learning, Insight learning, and Imitation.

UNIT 3: Motivation, Emotion, Memory and forgetting

Motivation - Definition of motivation – Theories of motivation - Physiological basis of motivation – Motivational factors in aggression – Self-actualization motivation. Emotion – Emotional expression –Theories of emotions. Kinds of remembering – Retrieval processes – The nature of forgetting – Two process theories of memory – Improving memory –Language and thought – Symbols and concepts – Structure – Forms of thought - Thinking and reasoning – Concept formation.

UNIT 4: Development, Sensory Processes and Perception.

Erikson's stages of psychosocial development Lawrence Kohlberg's stages of moral development Freud's Stages of Psychosexual Development Physiological basis of behavior – The brain and nervous system –The sensory process , Some general characteristic of senses – Five senses ,Perception: Organization – The role of learning in perception – Perception and attention – Perceptual process.

UNIT 5: Intelligence & Personality

Theories of intelligence – Measuring Intelligence – Kinds of intelligence tests – Ability – Formation of aptitude and attitude – Aptitude tests –Creativity and its tests. Personality – Definition of Personality – Theories of Personality – Assessment of Personality.Social Factors Influencing Personality.

UNIT 6: Social Psychology

Definition, Nature, Subject Matter and Scope Of Social Psychology-Applications and Importance of Social Psychology, Groups: Definition and Type- Primary And Secondary Groups Social Interaction, Social and Inter-Personal Relations. Inter-personal attraction – Love and Companionship. Prosocial-behavior. Modes of empathy: self – other differentiation and development of empathy. Social influence: attitude and conformity. Definition - Characteristics and Classification of Crowd. Leadership: Definition and characteristics, Defense Mechanisms, frustration and conflict, sources of frustration and conflict, types of conflicts. Aggression and Types of aggression.

UNIT 7: Health Psychology

Definition of Health Psychology -Relating Health Psychology to other fields Clinical Health Psychology, Public Health Psychology, Community Health Psychology, Critical Health Psychology

Abnormal Psychology: Concepts of normality and abnormality, causation of mental illness, neuroses, psychoses, psychosomatic disorders, measures to promote mental health.

Stress - Definitions- Models of Stress – Theories of Stress - Stress reactions – Coping and Stress Management techniques, Pain and its management - Psychological reactions of a patient to loss – Stages of Acceptance by Kubler-Ross.

REFERENCES:

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler, “**Introduction to Psychology**” – **7th Edition**. Tata McGraw Hill Book Co. New Delhi, 1993.
2. Baron, R. A., & Byrne, D (2006), “**Social psychology**”, New Delhi: Prentice hall of India private limited.
3. Elliot Aronson, Timothy D. Wilson, Robin M. Akert, Samuel R. Sommers, “**Social psychology**” **9th edition** published by Pearson education, Inc., 2006

4. Shelley E. Taylor. “**Health Psychology**”**Third Edition**. McGraw Hill International Editions, 1995.
5. Swaminathan, V.D, LathaSathish, “**Psychology for Effective Living**”, Department of Psychology, University of Madras.
6. Coleman, James. 1980. “**Abnormal Psychology and modern life**”. New Delhi: Tata McGraw Hill Ltd.

SEMESTER IV

S.NO	SUBJECT
1.	Pathology related to cardiac care technology paper I– Theory (UE)
2.	Pathology related to cardiac care technology paper I – Practical (UE)
3.	Pathology related to cardiac care technology paper II – Theory(UE)
4.	Pathology related to cardiac care technology paper II – Practical (UE)
5	Basic and Advanced Life support(IE)
6	Sociology(IE)

PATHOLOGY RELATED TO CARDIAC CARE TECHNOLOGY

PAPER I– THEORY (UE)

Course description:

- This course will provide an outline of pathological disease conditions to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Objectives:

- At the end of the course the students should be able to:
- To describe the pathological disease conditions related to the cardiovascular system.
- To understand the diagnostic procedures and treatmental procedures relevant to the pathological disease condition.

Learning objective skills:

- Learn to correlate the physiological functions and disease conditions

UNIT-I:

- **Valvular heart disease**
 - Aortic stenosis
 - Aortic regurgitation
 - Mitral stenosis
 - Mitral regurgitation ; mitral valve prolapse
 - Tricuspid stenosis and regurgitation
 - pulmonary stenosis and regurgitation

UNIT-II:

- **Coronary artery disease**
 - Types and location of myocardial infarction
 - Surgical treatment; other treatment modalities.

UNIT-III:

- **Heart failure**
 - Systolic heart failure
 - Diastolic heart failure
 - Right side heart failure
 - Left side heart failure

UNIT-IV:

- Dilated cardiomyopathy
- Hypertrophic cardiomyopathy
- Restrictive cardiomyopathy
- Apical cardiomyopathy

UNIT-V:

- **Disease of aorta**
 - Aortic aneurysm
 - Aortic dissection
 - Coarctation of aorta

RECOMMENDED BOOKS:

1. Cardiology, Desmond G. Julian, J. Campbell Cowan, James M. McLenachan.

PATHOLOGY RELATED TO CARDIAC CARE TECHNOLOGY PAPER I

– PRACTICAL (UE)

Learning objective:

- To know the pathological disease conditions related to the cardiovascular system.

Charts and Spotters:

- To give demonstration on pathological disease conditions related to cardiovascular system.
- **Valvular heart disease**
 - Aortic stenosis and regurgitation
 - Mitral stenosis and regurgitation ; mitral valve prolapsed
 - Tricuspid stenosis and regurgitation
 - pulmonary stenosis and regurgitation
- **Coronary artery disease**
 - Types and location of myocardial infarction
- **Myocardial disease**
 - Dilated cardiomyopathy
 - Hypertrophic cardiomyopathy
 - Restrictive cardiomyopathy
 - Apical cardiomyopathy

SPECIFIC LEARNING OUTCOME:

- To gain knowledge on pathological disease conditions and treatment related to cardiovascular system.

PATHOLOGY RELATED TO CARDIAC CARE TECHNOLOGY

PAPERII– THEORY (UE)

Course description:

- This course will provide an outline of Pathological disease conditions to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Objectives:

- At the end of the course the students should be able to:
- To describe the pathological disease conditions related to the cardiovascular system.
- To understand the diagnostic procedures and treatmental procedures relevant to the pathological disease condition.

Learning objective skills:

- Learn to correlate the physiological functions and disease conditions

UNIT-I:

- **Cyanotic congenital heart disease**
 - Tetralogy of Fallot
 - Transposition of great arteries
 - Tricuspid atresia
 - Trunkus arteriosus
 - Total anomalous pulmonary venous connection.
 - Double outlet right ventricle

UNIT-II:

- **Acyanotic heart disease**
 - Atrial septal defect
 - Ventricular septal defects
 - Patent ductus arteriosus
 - Coarctation of aorta

UNIT-III:

- Pericardial effusion
- Constrictive pericarditis
- Cardiac tamponade

UNIT-IV:

- **Hypertension**
 - Systemic hypertension
 - Pulmonary hypertension

UNIT-V:

- **Tumors of heart**
 - Left atrial myxoma
 - Left atrial thrombus
 - Infective endocarditis

RECOMMENDED BOOKS:

1. Cardiology, Desmond G. Julian, J. Campbell Cowan, James M. McLenachan.

PATHOLOGY RELATED TO CARDIAC CARETECHNOLOGY

PAPER II – PRACTICAL (UE)

Learning objective:

- To know the pathological disease conditions related to the cardiovascular system.

Charts and Spotters:

- To give demonstration on pathological disease conditions related to cardiovascular system.

Congenital heart disease

- Tetralogy of Fallot
- Transposition of great arteries
- Tricuspid atresia
- Trunkus arterious
- Total anomalous pulmonary venous connection.
- Double outlet right ventricle
- Atrial septal defect
- Ventricular septal defects
- Patent ductus arteriosus
- Coarctation of aorta

Pericardial disease

- pericardial effusion
- Constrictive pericarditis
- Cardiac tamponade

SPECIFIC LEARNING OUTCOME:

- To gain knowledge on pathological disease conditions and treatment related to cardiovascular system.

BASIC AND ADVANCED LIFE SUPPORT (IE)

Unit-I: TRAUMA LIFE-Part 1

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

Unit-II: TRAUMA LIFE-Part 2

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

Unit-II: TRAUMA LIFE-Part 3

- Pediatric trauma, Trauma in pregnant women, Workshop BLS, Workshop cervical spine immobilization, Imaging studies in trauma.

Unit-III: BASIC CARDIAC LIFE SUPPORT

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

Unit-IV: ADVANCED CARDIAC LIFE SUPPORT

- Hypotension/Shock, Acute myocardial infarction, Pediatrics Advanced life support, Defibrillation, Drugs used in ACLS, Emergency cardiac pacing, AED, Techniques for oxygenation and ventilation.

Text Books:

1. Handbook of Emergency Medicine, Suresh S. David, 8th edition, Elsevier, 2012

Reference Books:

1. Emergency Medicine, S. N. Chugh, 4th edition, CBS publishers, 2014

SOCIOLOGY (IE)

Unit 1: NATURE AND SCOPE OF SOCIOLOGY

- Definition, Historical background, subject matter of sociology, Nature and scope, Importance, Sociology of India, Relationship of sociology with other social sciences

Unit 2: FUNDAMENTAL CONCEPTS OF SOCIOLOGY

- Society and Individual, Community, Social structure and functions of Institutions, Association, Organization, Social system, social order, Social control, social groups, Social Process, Social change,

Unit 3: CLASSICAL THINKERS AND THEIR CONTRIBUTIONS

- Auguste comte, Emile Durkheim, Karl Marx, Max Weber, Herbert Spencer

Unit 4: SOCIOLOGY OF INDIA

- Characteristics of Indian society, Racial linguistic, Religious and demographic, Hindu social organization-ashramas, varnas, dharma and karma, purushartha, Caste system, Problems of SC&ST, Sanskritisation, Westernization and Modernization,

Unit 5: ANTHROPOLOGY AND CULTURAL ANTHROPOLOGY

- Definition of anthropology, Subfield of anthropology, Cultural Anthropology yesterday and today, Anthropological Perspectives, Early Anthropologist
- Environment and culture, Kinship, Clan Ethno methodology, Gender, Subsistence and Exchange, Social Organization and evolution of political system

Reference:

1. Bottomore.T.B., Sociology: A guide to problems and Literature,1971,Random House
2. Gisbert P. Fundamentals of sociology,3rd Edition,2004,Orient Longman publications
3. Neil J.Smelser,Handbook of sociology,1988.sage publication
4. Johnson R.M,Systematic Introduction to Sociology,1960,Allied Publishers
5. Cultural Anthropology,Barbara D.Miller,2006 Pearson/Allyn and Bacon Co

6. C.N.ShankarRao., Introduction to Sociology, 2008, S.CHAND & Company Publications.

7.C.N.ShankarRao., Sociology of India, S.CHAND & Company Publications.

SEMESTER – V

S.NO	SUBJECT
1.	Electrocardiography related to cardiac care technology paper I-Theory (UE)
2.	Electrocardiography related to cardiac care technology paper I - Practical (UE)
3.	Electrocardiography related to cardiac care technology paper II -Theory(UE)
4	Electrocardiography related to cardiac care technology paper II - Practical (UE)
5	Environmental science and Community medicine-Theory (IE)
6	Biostatistics and research methodology(IE)
7	Basic Nutrition (Elective) /Advanced Diagnostics techniques(Elective) (IE)

ELECTRO CARDIOGRAPHY RELATED

TO CARDIAC CARE TECHNOLOGY PAPER I – THEORY (UE)

Course description:

- This course will provide an outline of Basic electrocardiogram (ECG)

Objectives:

- At the end of the course the students should be able to
- To develop a knowledge about the diagnostic techniques of basic conduction abnormalities.
- To develop exhaustive ideology of the interpretation of the imaging techniques for cardiac rhythm and conduction abnormalities

Learning objective skills:

- Learn to diagnosis the abnormalities with interpretation of the imaging techniques.

UNIT-I:

- Fundamental principles of ECG
- The electrical field of heart
- Rotation of Heart
- The leads
- Standard Limb Leads
- Augmented Leads
- Precordial Leads
- ECG Waves
- ECG segments and intervals

UNIT-II:

- **Chamber enlargement**
 - Right atrial enlargement
 - left atrial enlargement
- **Axis deviation**
 - Right Axis deviation
 - left Axis deviation
 - Left ventricular hypertrophy, Right ventricular hypertrophy

UNIT-III

- **Sinus arrhythmias**
 - Sinus rhythm

- Sinus bradycardia
- Sinus tachycardia
- Paroxysmal atrial tachycardia

UNIT-IV

- **Atrial and Ventricular Arrhythmias**
 - Atrial fibrillation
 - Atrial flutter
 - Atria ventricular (AV) Nodal rhythm
 - Ventricular tachycardia
 - Ventricular fibrillation
 - Ventricular flutter

UNIT-V:

- Pulse oximeter
- Ventilators
- Arterial blood gas
 - Metabolic acidosis
 - Metabolic alkalosis
 - Respiratory acidosis
 - Respiratory alkalosis

RECOMMENDED BOOKS:

1. Hand Book of Clinical Electrocardiography, Tapas Kumar Koley, 1st edition, New Central Book Agency (P) LTD
2. An Introduction to Electrocardiography LeoSchamroth, , eighth adapted edition, WileyIndiaPv.Ltd

REFERENCE BOOKS:

1. The ECG made easy, John R. Hampton, eighth edition, Churchill Livingstone

ELECTRO CARDIOGRAPHY RELATED TO CARDIAC CARE

TECHNOLOGY PAPER I – PRACTICAL (UE)

Learning objective:

- To develop a knowledge about the diagnostic techniques for various conduction abnormalities.
- To develop exhaustive ideology of the interpretation of the imaging techniques for cardiac rhythm and conduction abnormalities

Practicals / Demonstration:

- ECG spotters of all cardiac disease conditions
- Right atrial enlargement
- left atrial enlargement
- Right Axis deviation
- Left Axis deviation
- Hypertrophy
- Arrhythmias
 - a. Sinus rhythm,
 - b. Sinus bradycardia and tachycardia
 - c. Ventricular tachycardia
 - d. Ventricular flutter
 - e. Ventricular fibrillation
- Pulse oximeter
- ABG

Specific learning outcomes (SLO):

- Will be able to identify and explain the different cardiac rhythms and conduction defects from the given ECG
- Will be able to explain ECG at the risk of cardiovascular emergencies
- Can bring out the mechanism of ECG deflections in pathological situations
- Can easily identify arrhythmias from the given ECG

ELECTROCARDIOGRAPHY RELATED TO CARDIAC CARE

TECHNOLOGY PAPER II THEORY (UE)

Course description:

- This course will provide an outline of advanced ECG and threadmill stress test.

Objectives:

- At the end of the course the students should be able to:
- To develop a knowledge about the diagnostic techniques for various conduction abnormalities.
- To develop exhaustive ideology of the interpretation of the imaging techniques for cardiac rhythm and conduction abnormalities

Learning objective skills:

- Learn to diagnosis the abnormalities with interpretation of the imaging techniques

UNIT-I:

- ECG in Coronary artery disease-Myocardial infarction
- QRS changes
 - Evolution of electrocardiographic changes
 - Localization of ischemia or infarction
 - Non-infarction Q waves
- Primary and secondary T wave change

UNIT-II:

HEART BLOCKS

- Sino atrial block
- First degree heart block
- Second degree heart block
- Third degree heart block
- Left anterior fascicular block
- Left posterior fascicular block
- Left bundle branch block
- Right bundle branch block

UNIT-III:

- Exercise stress testing- Exercise physiology, Exercise protocols, patient preparation
- Exercise test indications, contra-indications and precautions
- Holter monitoring
- Ambulatory blood pressure monitoring

UNIT-IV:

- Defibrillator
- Direct Current (DC) shock
- Monophasic and biphasic shock
- Technique and Indications for cardioversion
- Technique and Indications for defibrillation

UNIT-V:

- Electrolyte abnormalities related to ECG
 - Hyper kalemia
 - Hypo kalemia
 - Hyper calcemia
 - Hypo calcemia
 - Hyper magnesemia
 - Hypo magnesemia
 - Pre excitation syndrome

RECOMMENDED BOOKS:

1. Hand Book of Clinical Electrocardiography, Tapas Kumar Koley, 1st edition, New Central Book Agency (P) LTD
2. An Introduction to Electrocardiography LeoSchamroth, , eighth adapted edition, WileyIndiaPv.Ltd

REFERENCE BOOKS:

1. The ECG made easy, John R. Hampton, eighth edition, Churchill Livingstone

ELECTRO CARDIOGRAPHY RELATED TO CARDIAC CARE TECHNOLOGY

PAPER II - PRACTICAL (UE)

Learning objective:

- To develop a knowledge about the diagnostic techniques for various conduction abnormalities.
- To develop exhaustive ideology of the interpretation of the imaging techniques for cardiac rhythm and conduction abnormalities

Practicals / Demonstration:

- Charts and protocol identification in TMT
- ECG spotters of all cardiac disease conditions
- First degree heart block
- Second degree heart block
- Third degree heart block
- Primary and secondary T wave change
- Hyper kalemia
- Hypo kalemia
- Hyper calcemia
- Hypo calcemia
- Hyper magnesemia
- Hypo magnesemia
- Pre excitation syndrome

Specific learning outcomes (slo):

- Will be able to prove the pathological conditions in ecg
- Capable of assisting in non-invasive / invasive procedures
- Will be able to perform treadmill testing at cardiovascular emergencies
- Will be able to use the diagnostic strategies by available proven methods in treadmill testing.

ENVIRONMENTAL SCIENCE AND

COMMUNITY MEDICINE (IE)

UNIT-I

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

UNIT-II

- **Ecosystems:** Concept of an Ecosystem, Structure And Functions of an Ecosystem, Producers, Consumers and Decomposers, Cycles in The Ecosystem

UNIT-III

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

UNIT-IV

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

UNIT-V

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

UNIT-VI

- **Concept of health & disease:** Concept of health, Definition of health, Philosophy of health- Dimension of health - Concept of well being, Spectrum of health, Responsibility of health - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation - Modes of Intervention, Changing pattern of disease.

UNIT-VII

- **Epidemiology:** Definition & Explanation, Aims, Epidemiologic approach, Basic measurement in epidemiology & tools of measurement – of Mortality , Epidemiologic methods – Descriptive epidemiology – Analytical epidemiology -Cohort study – Experimental epidemiology – RCT- Association & Causation Uses of epidemiology (Criteria for judging causality) – Infection disease epidemiology Definitions Dynamic of disease transmission & Mode of Transmission – Disinfection – Definitions Types Agents used Recommended disinfection procedures – Investigation of an epidemic.

UNIT-VIII

- **Environmental & health:** Definition & Components (environment sanitation environmental sanitation) Water : Safe & Whole some water Requirements Uses source of water supply (sanitary well) – Purification (1).Large scale purification, (2). Small scale purification – Water quality – Special treatment of water Air: Composition the air of occupied room discomfort.

Air pollution & its effects. Prevention & Control of air pollution

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

RECOMMENDED TEXT BOOKS:

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

SEMESTER-V

BIOSTATISTICS & RESEARCH METHODOLOGY (IE)

INTRODUCTION

What is statistics – Importance of statistics in behavioral sciences – Descriptive statistics and inferential statistics – Usefulness of quantification in behavioral sciences. Measurements – Scales of measurements – Nominal, Ordinal, Interval and Ratio scales. Cumulative frequency curve – Drawing inference from graph. Measures of central tendency – Need – types: Mean, Median, Mode – Working out these measures with illustrations. Measures of variability – Need – Types: Range, Quartile deviation, Average deviation, Standard deviation, Variance – Interpretation. Normal distribution – General properties of normal distribution – Theory of probability – Illustration of normal distribution – area under the normal probability curve. Variants from the normal distribution – skewness – Quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.

RESEARCH METHODS:

Research Meaning- Scope and Objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis

DATA COLLECTION AND SAMPLING:

Data collection – Classification of data – Class intervals – Continuous and discrete measurements – Drawing frequency polygon – types of frequency polygon – Histogram. Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, etc.), hypothesis testing. Correlation – historical contribution – meaning of correlation – types: Product, moment, content correlation, variation of product, movement correlation, rank correlation, Regression analysis. Tests of significance- need for – significance of the mean – sampling error – significance of differences between means – interpretation of probability levels – small samples – large samples.

BASIC NUTRITION (ELECTIVE) (IE)

UNIT 1 - NUTRITIONAL ASSESSMENT

Nutritional anthropometric measurements ,Nutritional biochemical assessment, Clinical signs & symptoms,Dietary assessment

UNIT 2 - NUTRITION THROUGH LIFE CYCLE

Diet during infancy, Diet during preschool, Diet during school, Diet during adolescence, Diet during adulthood, Diet during geriatrics, Diet during special needs- Pregnancy and lactation

UNIT 3 - THERAPEUTIC NUTRITION 1

Dietary management in underweight, Dietary management in obesity, Dietary management in diabetes, Dietary management in hypertension.

UNIT 4 - THERAPEUTIC NUTRITION 2

Dietary management in cardiovascular diseases, Dietary management in renal diseases, Dietary management in cancer

ADVANCED DIAGNOSTIC TECHNIQUES (ELECTIVE) (IE)

Unit I

Volumetric analysis, Balancing & Weighing, Concept of solute & solvent, Unit of measurement. Specimen Collection & Processing: Specimen collection (Blood, urine, spinal fluid, saliva synovial fluid, Amniotic fluid), Preservation, transportation

Unit II

Clinical Enzymology: Principle of diagnostic enzymology, Digestive enzyme, miscellaneous enzyme. General Function Tests: Liver function test, Cardiac Function Test, Renal Function Test, Thyroid Function test, Reproductive endocrine function test

Unit III

Immunodiagnosics: Introduction, Antigen-Antibody Reactions, Conjugation Techniques, Antibody Production, Enzymes and Signal Amplification Systems, Separation and Solid-Phase Systems, Studies related to bacterial, viral and parasitic infections.

Unit IV

Product Development: Immunoassay Classification and Commercial Technologies, Assay Development, Evaluation and Validation, Reagent Formulations and Shelf Life Evaluation, Data Analysis, Documentation, Registration, and Diagnostics Start-Ups.

Unit V

DNA based diagnostics: PCR, RFLP, SSCP, Microarrays, FISH, In-situ hybridization, Studies related to bacterial, viral and parasitic infections, Cell based diagnostics: Antibody markers, CD Markers, FACS, HLA typing, Bioassays.

SEMESTER VI

S.NO	SUBJECT
1.	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper I- Theory (UE)
2.	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper I - Practical (UE)
3.	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper II- Theory (UE)
4	Echocardiography and basics of cardiac catheterization related to cardiac care technology paper II - Practical (UE)
5	Health care and basic principles (IE)
6	Hospital Management/Applied Clinical Research(Elective) (IE)

SEMESTER – VI

ECHOCARDIOGRAPHY AND BASICS OF CARDIAC CATHETERIZATION RELATED TO CARDIAC CARE TECHNOLOGY PAPER I – THEORY(UE)

Course description:

- This course will provide an outline of echocardiography and basics of cardiac catheterization related to cardiac care technology.

Objectives:

- At the end of the course the students should be able to:
- To develop a knowledge about the diagnostic techniques in echocardiography
- To develop exhaustive ideology of the interpretation of the imaging techniques in echocardiography

Learning objective skills:

- Learn to diagnosis the abnormalities with interpretation of the imaging techniques

UNIT-I:

- Principles of ultra sound
- 2D echo,B-mode,M-mode
- Doppler echocardiography
- Pulse wave Doppler,continuous wave Doppler
- Continuity equation,
- Views in echocardiography
- Analysing the segments in left ventricle.

UNIT-II:

- **Valvular heart disease**
 - Mitral stenosis and regurgitation
 - Aortic stenosis and regurgitation
 - Tricuspid stenosis and regurgitation
 - Pulmonary stenosis and regurgitation

UNIT-III:

- **Cardiomyopathies:**
 - Dilated Cardiomyopathy
 - Restrictive Cardiomyopathy
 - Hypertrophic Cardiomyopathy
 - Apical Cardiomyopathy

UNIT-IV:

- **Pericardial diseases**
 - Pericardial effusion
 - Cardiac tamponade
 - Constrictive pericarditis

UNIT-V:

- Infective endocarditis
- Left atrial thrombus
- Left atrial myxoma

UNIT-IV:

- Dobutamine Stress Echo Cardiography
- Contrast Echo Cardiography

UNIT-V:

- Cardiac catheterization:
 - Type of catheters
 - Techniques of sterilization-advantages and disadvantages of each method preparing up the cardiac catheterization laboratory for a diagnostic study Table movement
 - Intra cardiac pressures
 - Thermo dilution method
 - Oxygen dilution method
 - Principles of oximetry

RECOMMENDED BOOKS:

1. The Echo Manual ,jae K Oh ,third edition ,Lippincott Williams and Wilkins
2. Practice of Clinical Echocardiography Catherine M otto,fourth print Rev edition ,, W.B.Saunders Company

REFERENCE BOOKS:

1. The Echo made easy, Sam kaddoura ,Churchill Livingstone ,second edition
2. Feigenbaum's echocardiography, William F Armstrong , Thomas Ryan seventh edition,,Wolters Kluwer

ECHOCARDIOGRAPHY AND BASICS OF CARDIAC CATHETERIZATION
RELATED TO CARDIAC CARE TECHNOLOGY PAPER I – PRACTICAL (UE)

Learning objective:

- To develop a knowledge about the diagnostic techniques in echocardiography
- To develop exhaustive ideology of the interpretation of the imaging techniques in echocardiography

Practicals / Demonstration:

- Disease conditions diagnosed by Echocardiogram

Valvular heart disease

- Mitral stenosis and regurgitation
- Aortic stenosis and regurgitation
- Tricuspid stenosis and regurgitation
- Pulmonary stenosis and regurgitation

Cardiomyopathies:

- Dilated Cardiomyopathy
- Restrictive Cardiomyopathy
- Hypertrophic Cardiomyopathy
- Apical Cardiomyopathy

Pericardial diseases

- Pericardial effusion
- cardiac tamponade
- constrictive pericarditis
- Analysis of LV wall segments.

Specific learning outcomes (slo):

- Will be able to identify abnormal conditions in echocardiography
- Will be able to prove the pathological conditions by performing echo
- Capable of assisting in non-invasive / invasive procedures
- Will be able to perform Echocardiography at cardiovascular emergencies
- Will be able to use the diagnostic strategies by available proven methods in echocardiography

ECHOCARDIOGRAPHY AND BASICS OF CARDIAC CATHETERIZATION **RELATED TO CARDIAC CARE TECHNOLOGY PAPER II– THEORY(UE)**

Course description:

- This course will provide an outline of echocardiography and basic cardiac catheterization.

Objectives:

- At the end of the course the students should be able to:
- To develop a knowledge about the diagnostic techniques in echocardiography
- To develop exhaustive ideology of the interpretation of the imaging techniques in echocardiography

Learning objective skills:

- Learn to diagnosis the abnormalities with interpretation of the imaging techniques

UNIT-I:

- Echocardiographic detection of congenital heart disease:
 - Atrial septal defect
 - Ventricular septal defect
 - Patent ductus arteriosus
 - Coarctation of aorta

UNIT-II:

- Tetralogy of Fallot
- Total anomolus pulmonary venous return
- Tricuspid atresia
- Transposition of great arteries
- Double outlet right ventricle

UNIT-III:

- Evaluation of systolic and diastolic function
- Analysis of regional wall motion abnormality

UNIT-IV:

- Transesophageal echocardiography
- Disease of aorta

UNIT-V:

- Coronary angiography
- Left Ventriculography – catheters, views, use of the injector
- Right heart catheterization and angiography

RECOMMENDED BOOKS:

1. The Echo Manual ,jae K Oh ,third edition ,Lippincott Williams and Wilkins
2. Practice of Clinical Echocardiography Catherine M otto,fourth print Rev edition ,, W.B.Saunders Company

ECHOCARDIOGRAPHY BASICS OF CARDIAC CATHETERIZATION RELATED TO
CARDIAC CARE TECHNOLOGY PAPER II — PRACTICAL (UE)

Learning objective:

- To develop a knowledge about the diagnostic techniques for various conduction abnormalities.
- To develop exhaustive ideology of the interpretation of the imaging techniques for cardiac rhythm and conduction abnormalities

Practicals / Demonstration:

- Disease conditions diagnosed by Echocardiogram
 - Atrial septal defect
 - Ventricular septal defect
 - Patent ductus arteriosus
 - Coarctation of aorta
 - Tetralogy of Fallot
 - Total anomolus pulmonary venous return
 - Tricuspid atresia
 - Transposition of great arteries
 - Double outlet right ventricle
 - Analysis of LV wall segments.
 - Analysis of regional wall motion abnormality

Specific Learning Outcomes (SLO):

- Will be able to identify abnormal conditions in echocardiography
- Will be able to prove the pathological conditions by performing echo
- Capable of assisting in non-invasive / invasive procedures
- Will be able to perform Echocardiography at cardiovascular emergencies
- Will be able to use the diagnostic strategies by available proven methods in echocardiography

HEALTH CARE AND BASIC PRINCIPLES (IE)

UNIT-I Concept of Health Care and Health Policy

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

UNIT-II . Health Organization

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

UNIT-III Health Policy and National Health Programme

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

UNIT-IV Health Economics

Fundamentals of Economics

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

UNIT-V. Methods & Techniques of Economic Evaluation of Health Program

- Cost Benefit & Cost Effective Methods

UNIT-VI. Household & Health

Health Expenditure & Outcome

- Rationale for Government action
- Household capacity, income and schooling

UNIT-VII Economics of Health

- Population based health services
- Economics of Communicable and Non Communicable diseases

UNIT-VIII Health Insurance

REFERENCE BOOKS:

1. Principles of Hospital Administration and Planning, BM Sakharkar, 2nd edition, Jaypee Brothers, Medical Publishers Pvt. Limited, 2008
2. Hospital Administration And Management : Theory And Practice, R. Kumar S.L. Goel, Deep and Deep Publications, 2007
3. Principles of Management, Mason Andrew Carpenter, Talya Bauer, 3rd edition, Flat World Knowledge, L.L.C., 2010

HOSPITAL MANAGEMENT(ELECTIVE) (IE)

Objectives:

- To promote awareness of health care among all sections of the Indian people
- To promote awareness among functionaries involved in Health and Hospital Management.
- To promote research in the field of Health and Hospital Management. in order to improve the efficiency of Health Care delivery Systems.
- To promote the development of high quality hospital services and community health care.
- To promote a forum for the exchange of ideas and information among health and hospital planners, academicians, administrators, various statutory bodies and the general public for the improvement of Hospital and Health Care delivery Systems
- **To develop norms and standards for accreditation of the Health Care Organization and adopt means of evaluation of such institutions, so as to improve the quality of health care in the community**
- To provide opportunities for training and research in all aspects of Hospital Services Health Care Delivery System and Health Care Administration.
- To update the knowledge and skill of the Health & Hospital Administrators and other personnel involved in the management of health care organization through continuous education and research.

UNIT – I

Introduction to Management: Introduction, concept, Characteristics and nature, scope, Principles of Management, Functions and techniques.

UNIT II

Planning: Principles, Characteristics, Essential of good planning, advantages and limitations, Classifications.

UNIT – III

Staffing: Importance, Norms and activities, PCS, Types of PCS, Duty Roaster.

Human resource management: HR planning, Recruitment, selection process, Placement, Orientation of new staff and training, Staff development , staff promotion.

UNIT – IV

Budgetting and material management: Purpose, Types, Principles, Function, cost benefit analysis, Auditing. Principles of MM, process, supply and equipment, Inventory control, Procurement.

UNIT- V

Controlling-Quality management: Essential of effective control system, Importance of controlling, TQM. Hospital and patient care, ward management. Legal Issues.

UNIT - VI

Staff development and welfare:

Importance of staff development, Training Vs Education, Function. Staff welfare. Inservice education, Continuing education and career Opportunities-Component, manager role.

APPLIED CLINICAL RESEARCH (ELECTIVE) (IE)

UNIT I: Introduction to clinical research

Basic pharmacology and drug development process, clinical research definition, Basic terminology used in clinical research, preclinical studies, Introduction to pharmacoeconomics,

Types of clinical trials, Good Clinical Practices, and Scope of Clinical Research.

UNIT II: Clinical trials

New drug discovery process- purpose, main steps involved in new drug discovery process, timelines of each step, advantages and purposes of each step, Pre clinical toxicology: General principles, Systemic toxicology, animal toxicity requirements, Phase-I, II, III, IV trials: Introduction and designing, Various phases of clinical trials, Termination of trial, Safety monitoring in clinical trials

UNIT III: Ethics & Regulations in Clinical research

Ethical Theories and Foundations, Ethics Review Committee and Informed Consent Process, Integrity & Misconduct in Clinical Research Clinical Trial Application in India Import & Export of Drug in India, Investigational New Drug application (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA), Post Drug Approval Activities, PMS, FDA Audits and Inspections EU Regulatory Affairs

UNIT IV: Principles of controlled clinical trials

Clinical trial design (observational and interventional) protocol, consent in clinical trials, placebo, bias and methods to prevent bias, ethics in clinical trials, monitoring, problems and solutions of controlled clinical trials.

UNIT V: Biostatistics and data management

Preparation of a successful clinical study, Study management, Project management Documentation, Monitoring, Audits and Inspections Pharmacovigilance Training in clinical research Budgeting in clinical research, Supplies and vendor management

SEMESTER-VII

S.NO	SUBJECT
1	Project/ Dissertation



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