SUNRISE UNIVERSITY ALWAR
COURSE CURRICULUM FOR
BACHALARE OF SCIENCE
CARDIAC TECHNOLOGY CARDIOLOGY

Semester I, II (2025-26)

Semester III, IV (2026-27)

Semester V and VI (2027-28)

FIRST SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT101T	English	40	60	100	4
BSCT102T	Anatomy	40	60	100	4
BSCT103T	Physiology	40	60	100	4
BSCT104T	Basic Biochemistry	40	60	100	4
BSCT105T	Environmental Science	40	60	100	4
BSCT106P	Anatomy Laboratory	60	40	100	1
BSCT107P	Physiology Laboratory	60	40	100	1
BSCT108P	Basic Biochemistry Laboratory	60	40	100	1
Total		**380**	**420**	**800**	**23**

SECOND SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT201T	General Pathology	40	60	100	4
BSCT202T	Microbiology	40	60	100	4
BSCT203T	Pharmacology	40	60	100	4
BSCT204T	Psychology	40	60	100	4
BSCT205T	Introduction to Computer	40	60	100	4
BSCT206P	Pathology Laboratory	60	40	100	1
BSCT207P	Microbiology Laboratory	60	40	100	1
BSCT208P	Pharmacology Laboratory	60	40	100	1
Total		**380**	**420**	**800**	**23**

THIRD SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT301T	Applied Pathology	40	60	100	4
BSCT302T	Applied Microbiology	40	60	100	4
BSCT303T	Basic Cardiac Care Technology	40	60	100	4
BSCT304T	Introduction Biomedical Instrumentation	40	60	100	4
BSCT305T	Health care	40	60	100	4
BSCT306P	Applied Pathology Laboratory	60	40	100	1
BSCT307P	Applied Microbiology Laboratory	60	40	100	1
BSCT308P	Basic Cardiac Care Technology Laboratory	60	40	100	1
Total		**380**	**420**	**800**	**23**

FOURTH SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT401T	Cardiac Evaluation and Therapies -I	40	60	100	4
BSCT402T	Basics Cardiac evaluation and therapies	40	60	100	4
BSCT403T	Basics of Medical Disorders	40	60	100	4
BSCT404T	Biostatistics and Research Methodology	40	60	100	4
BSCT405T	Constitution of India	40	60	100	4
BSCT406P	Cardiac Evaluation and Therapies Laboratory - I	60	40	100	1
BSCT407P	Basics Cardiac evaluation and therapies Laboratory	60	40	100	1
BSCT408P	Basics of Medical Disorders Laboratory	60	40	100	1
Total		**380**	**420**	**800**	**23**

FIFTH SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT501T	Patient care and Basic Nursing	40	60	100	4
BSCT502T	Cardiac Evaluation and Therapies -II	40	60	100	4
BSCT503T	Advanced Cardiac Care Technology -I	40	60	100	4
BSCT504T	Biomedical Engineering Devices for Cardiac Care Technology	40	60	100	4
BSCT505T	Medical Ethics	40	60	100	4
BSCT506P	Patient care and Basic Nursing Laboratory	60	40	100	1
BSCT507P	Advanced Cardiac Care Technology Laboratory	60	40	100	1
BSCT508P	Cardiac Evaluation and Therapies Laboratory II	60	40	100	1
Total		**380**	**420**	**800**	**23**

SIXTH SEMESTER

PAPERS CODE	PAPERS NAME	INTERNAL	EXTERNAL	TOTAL	CREDIT
BSCT601T	Advanced Cardiac Care Technology -II	40	60	100	4
BSCT602T	Cardiac Evaluation and Therapies -III	40	60	100	4

BSCT603T	Applied Coronary Angiography and Echocardiography	40	60	100	4
BSCT604T	Basic Intensive Care	40	60	100	4
BSCT605T	Hospital Management	40	60	100	4
BSCT606P	Cardiac Evaluation and Therapies Laboratory III	60	40	100	1
BSCT607P	Applied Coronary Angiography and Echocardiography Laboratory	60	40	100	1
BSCT608P	Project	60	40	100	1
Total		**380**	**420**	**800**	**23**

English – UNIT - I

Introduction

a) Study Techniques - Reading Comprehension

Exercises on reading passages and answering questions based on the passage.

b) Reading and Comprehension

1. Review of selected materials and expressing oneself in one's words
2. Book Review
3. Enlargement of Vocabulary

c) Use of the Dictionary

Tips on how to use the dictionary

1. Choose the right dictionary.
2. Read the introductions.
3. Learn the abbreviations.
4. Learn the guide to pronunciation.
5. Looking up for a word

a) Find the section of the dictionary with first letter of your word.
b) Read the guide words.
c) Scan down the page for your word.
d) Read the definition.

6. Online dictionaries
7. Thesaurus

It is a dictionary of synonyms and antonyms, such as the online Thesaurus.com.

8. Foreign Expressions - meaning and pronunciation

Enlargement of Vocabulary

Roots - A to G

UNIT- II

Applied Grammar

a) Correct Usage

The Eight Parts of Speech

1. Noun
2. Pronoun
3. Adjective

4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection

b) The Structure of Sentences 1. What is a sentence?

2. What are clauses?
3. What are phrases?

c) Sentence Combinations

1. Simple sentences
2. Compound sentences
3. Complex sentences

Enlargement of Vocabulary

Roots: H to M

UNIT- III

Written Composition

a) Précis Writing and Summarizing

1. Definition of précis:

   A précis or summary is an encapsulation of someone's writing or ideas. Technically it should be one-third the length of the actual passage given.

2. Definition of summary:

   Summaries may not always follow a direct line through what they're summarizing - if you want to summarize someone else's ideas in a few sentences, it might make more sense if you begin with their conclusion, and work back to the arguments they use to develop that conclusion.

Guidelines to follow while writing a summary are:

1) Read.
2) Reread.
3) One sentence at a time.
4) Write a thesis statement.
5) Check for accuracy.
6) Revise.

b) Writing of a Bibliography

I. What is a bibliography?

A bibliography is an alphabetical list of all materials consulted in the preparation of your assignment.

II. What is an annotated bibliography?

An annotated bibliography is an alphabetical list of books or articles for which you have added explanatory or critical notes.

III. Why you must do a bibliography?

a) To acknowledge and give credit to sources of words, ideas, diagrams, illustrations and quotations borrowed, or any materials summarized or paraphrased.

b) To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.

IV. What must be included in a bibliography?

author

Title

Place of publication

publisher

date of publication

Page number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopedias, or in anthologies).

V. Writing a bibliography in MLA style

1. Standard Format for a Book:

Author. Title: Subtitle. City or Town: Publisher, Year of Publication.

If a book has no author or editor stated, begin with the title. If the city or town is not commonly known, add the abbreviation for the State or Province.

1 Standard Format for a Magazine, Periodical, Journal, or Newspaper Article:
Author. "Title: Subtitle of Article." Title of Magazine, Journal, or Newspaper Day, Month, Year of Publication: Page Number(s).

Enlargement of Vocabulary
Roots - N to S

UNIT - IV

Communication: Oral and Written

Nature, Process, Types and Flow of Communication

a) **Organization of Effective Note-taking**

Why good note-taking is important

Effective note-taking is an important practice to master at university. You have a lot of new knowledge and you need to develop reliable mechanisms for recording and retrieving it when necessary. But note-taking is also a learning process in itself, helping you to process and understand the information you receive.

b) **Discussions and Summarization**

Tips on taking Minutes of a Meeting

Why Meeting Minutes Matter

Meeting minutes are important. They capture the essential information of a meeting - decisions and assigned actions. The following instructions will help you take useful and concise meeting minutes.

Before the Meeting

If you are recording the minutes, make sure you are not a major participant in the meeting. You cannot perform both tasks well.

Create a template for recording your meeting minutes and make sure you leave some blank space to record your notes.

Decide how you want to record your notes. If you are not comfortable relying on your pen and notepad, try using a tape recorder or, if you are a fast typist, take a laptop to the meeting.

During the Meeting

As people enter the room, check off their names on your attendee list. Ask the meeting lead to introduce you to meeting attendees you are not familiar with. This will be helpful later when you are recording assigned tasks or decisions.

After the Meeting

Review the notes and add additional comments, or clarify what you did not understand right after the meeting.

c) Group Discussion:

1. Dos in a group discussion:

Be Confident. Introduce yourself with warm smile and get into topic soon.

Have eye-contact with all group members.

Learn to listen.

Be polite.

Be a good team player. Move with all group members and help them when needed.

2. Don'ts in a group discussion:

Don't be harsh when you are interrupted.
Don't interrupt the other person.
Don't try to push your ideas on others.
Don't argue. Everyone is free to express their ideas.

d) Oral Report

An oral report is a presentation, usually done for a student's teacher and classmates, though it can also be done for a larger segment of the school community, for parents, or for a more open group, depending on the circumstances. For example, at a science fair, a student might present a report on his or her project periodically for the class, for other visitors who pass by, and for judges.

Students should be trained to give oral reports.
Enlargement of Vocabulary

Roots - T to Z

UNIT -V
The study of various forms of Composition

a) Paragraph
The Structure of Paragraphs

1. What is a Paragraph?

Paragraphs are comprised of sentences, but not random sentences. A paragraph is a group of sentences organized around a central topic.

2. The Secrets to Good Paragraph Writing:
Four Essential Elements

The four elements essential to good paragraph writing are: unity, order, coherence, and completeness.

Exercises for students on short paragraph topics.

c) Essay

What is an essay?

An essay is an organised collection of your thoughts on a particular topic.

How to write an essay?

The writing of an essay has three major parts:

1. Introduction
2. Main Body
3. Conclusion

c) Letter

Mechanics of writing formal and business letters

Exercises on writing letters for students

d) Writing Reports:

Project Report

L: 45 + T: 15 = TOTAL: 60 PERIODS

ANATOMY

OBJECTIVES

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

1. Describe the structure, composition and functions of the organ systems of human body
2. Describe how the organ systems function and interrelate.
3. Learn basic technical terminology and language associated with anatomy.

Learning Objectives: Skills

1. Use the process of prosecutor to investigate anatomical structure.
2. Use the microscope to learn anatomical or histological structure.
3. Learn how to study, interpret and care for anatomical specimens.

UNIT I

Organization of the Human Body **9hrs**

Introduction to the human body, Definition and subdivisions of anatomy, Anatomical position and terminology. Cell - Definition of a cell, shapes and sizes of cells, Parts of a cell - cell

Membranes, cytoplasm, sub cellular organelles. Cell Division - Definition and main events in different stages of mitosis and meiosis. Tissues - Tissues of the body, Definition and types of tissues, Characteristics, functions and locations of different types of tissues, Epithelial tissue - definition, classification with examples. Glands- classification with examples.

UNIT II

Locomotion and Support **9hrs**

Cartilage - Types with examples. Skeleton - Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Marking of bones. Functions of bones. Development (types and ossification) and growth of bone. Name, location and general features of the bones of the body. Joints - Definition and types of joints with examples. Axes andkind of movements possible. Name, location, type, bones forming, ligaments, movements possible and the muscles producing such movements of the joints of the body. Muscular system- Parts of the skeletal muscle. Definition of origin and insertion. Classification of muscular tissue. Compartment muscles of upper limb, lower limb, sternocleid mastoids

UNIT III

Maintenance of the Human Body **9hrs**

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 and blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of major arteries and veins. Lymphatic system- Lymph, lymphatic vessels, name, location and features of the lymphoid organs. Respiratory system-Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura. Digestive system - Names of organs of digestion. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder

UNIT IV

Urinary system and Reproductive system **9hrs**

Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra. 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 & its supports, uterine tube, ovary & mammary gland. Development - Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles, events of 1^{st}, 2^{nd} and 3^{rd} weeks of development, folding of embryo. Derivatives of germ layers, placenta.

UNIT V

Control Systems of the Body **9hrs**

Nervous system - Sub-divisions of the nervous system. Brain - Sub-divisions, location external features and internal structure of medulla oblongata, pones, mid-brain, cerebellum and cerebrum. Spinal cord - Location, extent, spinal segments, external features and internal structure. Location and features of thalamus and hypothalamus. Locations and subdivisions of basal ganglia. 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. Sense organs - Location and features of the nose, tongue, eye, ear and skin**.** 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.

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions:

1. Ross and Wilson: Anatomy and Physiology in Health and illness
2. Understanding Human Anatomy and Physiology, William Davis (p) MC Graw Hill
3. Essentials of Human Embryology. Bhatnagar, Orient Black swan Pvt. Ltd.
4. Anatomy for B.Sc Nursing by Renu Chauhan. Arichal publishing company 2012
5. Hand book of Anatomy BD Chaurasia
6. Basics in Human Anatomy for B.Sc. Paramedical Courses 1st edition 2008 Jaypee Publishers

Reference books:

1. B D Chaurasia: Regional Anatomy. Vol I, II, III 6th edition.

PHYSIOLOGY

OBJECTIVES

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

1. Blood cell counts
2. Nerve and muscle functions
3. Cardiac functions
4. Pulmonary functions
5. Renal functions
6. The actions of various hormones
7. Functions of Central nervous system and special senses

UNIT -I

General physiology and Blood **9hrs**

General Physiology - Organization of the cell and its function, homeostasis, tansport across cell membrane, Membrane Potentials - Resting Membrane Potential & Action Potential, Body Fluid Compartments - Normal Values. Blood - Introduction: composition and function of blood, Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation. Structure, function, concentration, physiological variation, methods of estimation of haemoglobin. White blood cells: production, function, count. Platelets: origin, normal count, morphology & functions. Plasma proteins: types, functions. Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting. Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching. Rh system: Rh factor, Rh incompatibility. Blood transfusion: indication, transfusion reactions. Anticoagulants: classification, examples and uses. Anaemias: morphological and etiological classification, - Blood indices: CI, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values.

UNIT -II

Digestive system & Respiratory system **9hrs**

Digestive System-Physiological anatomy of gastro intestinal tract, functions of digestive system. Salivary glands: structure and functions, deglutition: stages and regulation. Stomach: structure

and functions. Gastric secretion: composition function regulation of gastric juice secretion. Pancreas: structure, function, composition of pancreatic juice. Functions of liver. Bile secretion, composition, function. Jaundice: types, Functions of gall bladder. Small intestine: functions, digestion, absorption, movements. Large intestine: functions, movements defecation. Respiratory system - Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary & intrapleural pressure. Surface tension, recoil tendency of the thoracic cage and lungs. Transport of respiratory gases: transport of oxygen & carbon dioxide, oxy haemoglobin dissociation curve, factors affecting it. Lung volumes and capacities - normal values Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre. Applied physiology: hypoxia, cyanosis, dyspnoea, apnoea.

UNIT -III

Cardiovascular and Endocrine system **9hrs**

Cardiovascular system - Heart: Physiological Anatomy, Nerve supply. Properties of cardiac muscle, cardiac cycle. Conducting System of Heart, Origin and Spread of Cardiac Impulse. Electrocardiogram (ECG) waves and normal duration. Recording. Cardiac Cycle: Phases and Volume Changes. Normal heart sounds, areas of auscultation. Pulse: jugular, radial pulse. Cardiac output: definitions of stroke volume, cardiac index, factors Affecting It. measurement of Cardiac output. General principles of circulation. Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension. Factors affecting it and regulation. Physiological variations & regulation of heart rate. Coronary circulation. Shock. Endocrine System - Classification of endocrine glands & Definition of hormone. Pituitary hormones: anterior and posterior pituitary hormones, secretion, functions. Thyroid gland: physiological anatomy, hormone secreted, physiological function, regulation, secretion, disorders (hypo and hyper secretion of hormone). Adrenal cortex: physiological anatomy. cortical hormones, functions and regulation. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline. Hormones of pancreas. Insulin: secretion, regulation, function and action. Diabetes mellitus: regulation of blood glucose level. Parathyroid gland: function, action, regulation of secretion of parathyroid hormone. Calcitonin.

UNIT -IV

Excretory system and Reproductive system **9 hrs**

Excretory System - Functional anatomy of kidney. Juxta glomerular apparatus: structure and function. Glomerular filtration. Tubular function (reabsorption and secretion). Micturition, innervation of bladder, cystometrogram. Artificial kidney, renal function tests skin and body temperature. Reproductive system – Male reproductive system: functions of testes, spermatogenesis: Endocrine functions of testes -Female reproductive system: oestrogen, progesterone, menstrual cycle: ovulation, physiological changes during pregnancy, pregnancytests. Lactation: composition of milk, factors controlling lactation.

UNIT –V

Muscle nerve physiology, Nervous system and Special senses **9hrs**

Muscle nerve physiology - Classification and properties of neuron and neuroglia. Classification of nerve fibers. Classification of muscle, structure of skeletal muscle, neuromuscular junction. Transmission across nmj. Excitation contraction coupling. Muscle tone, fatigue, rigor mortis.

Nervous system - Organisation of nervous system. Synapse: structure, types, properties. Receptors: definition, classification, properties. Sensations-pain. Organization Spinal cord. Ascending tracts, descending tracts. Reflex: definition reflex arc, clinical classification of reflexes: Babinski's sign. Hypothalamus- functions. Cerebral cortex lobes – functions. Cerebellum- functions. Basal ganglia functions. Cerebro Spinal Fluid (CSF): formation, circulation & reabsorption, composition and functions. Lumbar puncture. Autonomic Nervous System: Sympathetic and parasympathetic distribution. Special senses - Vision: structure of eye, function of different parts. Structure of retina. Visual pathway, errors of refraction. Hearing: structure and functions of ear. Taste: taste buds and taste pathway. Olfaction: receptors, pathway.

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions:

1. A.K.Jain, Human Physiology and Biochemistry for Physical Therapy and Occupational Therapy, 1st Ed. Arya Publication.
2. Dr.Venkatesh.D and Dr.SudhakarH.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Book.

Reference Books

1. A.K.Jain, Text book of Physiology for Medical Students, 4th Ed. Arya Publiction.
2. Guyton (Arthur) Text Book of Physiology.11th Ed. Prism Publishers.
3. Ganong (William F) Review of Medical Physiology. 23rd Ed . Appleton.
4.

BASIC BIOCHEMISTRY

UNIT I **9hrs**

Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids &Nucleotides

Cell- Structure & Function of Cell Membrane, Subcellular Organelles and their Functions. Carbohydrates- Definition, Classification & Biological importance of carbohydrates, Derivatives of Monosaccharides. Proteins- Definition & Classification of amino acids & Proteins, Biologically important peptides, Plasma proteins, Immunoglobulins. Lipids- Definition, Classification & Biological importance and Functions of Lipids. Structure and functions of Cholesterol, types and functions of Lipoproteins. Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides.

UNIT II **9hrs**

Enzymes & Acid base balance

Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition & Regulation of enzyme activity. Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

UNIT III **9hrs**

Vitamins & Minerals

Vitamins-Classification, Sources, RDA, Functions (in brief), deficiency manifestations and hypervitaminosis. Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, selenium, sodium, potassium and chloride.

UNIT IV **9hrs**

Nutrition, Blood chemistry & Urine Chemistry

Nutrition- Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications, Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance, Protein energy malnutrition, Total parenteral nutrition, dietary fibers. Blood chemistry- Biochemical components & their reference ranges in normal & diseased states. Urine chemistry- Biochemical components & their reference ranges in normal & diseased states.

UNIT V **9hrs**

Clinical Biochemistry

Specimen Collection- Blood, Urine and Body fluids. Preanalytical, analytical and post analytical errors. Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases. Diagnostic enzymology, Assessment of arterial Blood gas status and electrolyte balance, Point of Care Testing. Renal Function tests (in brief), Liver function tests(in brief), Biomedical Waste Management.

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions:

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry –Pankaja Naik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

Reference Books Recent Edition

1. Harpers Biochemistry
2. Clinical Biochemistry-Michael L.Bishop
3. Textbook of Biochemistry-Rafi M.D
4. Lippincott's Illustrated review of Biochemistry
5. Practical Clinical Biochemistry-Harold Varley
6.

ENVIRONMENTAL SCIENCE

Learning Objectives

1) To know various Environmental factors Health
2) To learn the modes of disease transmission and various control measures

UNIT I

Environment, Health and Water **9 hrs**

Introduction to Environment and Health and Water- Ecological definition of Health, Population perspective of relations, Health & environment perspective of relations, Environmental factors, Environmental Sanitation, Need to study environmental health, Predominant reasons for ill-health in India. Water - Safe and wholesome water, requirements, uses, sources; sanitary well; Hand pump; water Pollution; Purification of water; large scale & small scale; slow sand filters; rapid sand filters; Purification of Water on a small scale; Household purification, Disinfection of wells; water quality criteria & standards.

UNIT II

Air, Light, Noise, Radiation **9 hrs**

Air- Composition, Indices of Thermal Comfort, Air pollutants, Air Pollution - Health Effects, Environmental Effects, Green-house effect, Social & Economic Effects, Monitoring, Prevention & Control. Light, Noise, Radiation. Natural and Artificial light; Properties, sources, noise pollution and its control, types, sources, biological effects and protection.

UNIT III

Waste and Excreta Disposal **9 hrs**

Disposal of Wastes - Solid Wastes, Health hazards, Methods of Disposal; Dumping, Controlled tipping/ sanitary landfill, Incineration, Composting. Excreta Disposal - Public health importance, Health hazards, sanitation barrier, Methods of excreta disposal, unsewered areas and sewered areas, sewage, Modern Sewage Treatment.

UNIT IV

Housing and Health and Medical **9 hrs**

Housing and Health - Human Settlement, Social goals of housing, Criteria for Healthful Housing by Expert Committee of the WHO, Housing standards- Environmental Hygiene Committee, Rural Housing Standards, Overcrowding, Indicators of Housing. Medical Entomology - Classification of Arthropods, Routes of Disease transmission, Control measures.

UNIT V

Insecticides and Rodents **9 hrs**

Insecticides - Types, mechanism of action, dosage and application for control of insects. Rodents - Rodents and its importance in disease, along with anti-rodent measures.

TOTAL: 45 HOURS

Reference Books (latest edition)

1) Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers; 2015. p.135-141
2) Suryakantha. Textbook of Community Medicine with recent advances. 4th edition.
3) Bhalwar R. Textbook of Public Health and Community Medicine. 2nd edition. Pune: Department of Community Medicine AFMC, 2012
4) Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015.

ANATOMY LABORATORY

1) Demonstration of parts of microscope and its uses
2) Demonstration of skeleton and joint
3) Demonstration of deltoid and gluteus maximus, Cubital fossa
4) Demonstration of heart and its blood supply, demonstration of major arteries of upper limb and lower limb, histology of cardiac muscle and histology of vessels
5) Demonstration of location and parts of lungs, histology of trachea and lungs
6) Demonstration of location of stomach, small and large intestines. Location and features of pancreas, liver and gall bladder
7) Demonstration of location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra

8) Demonstration of location of male and female reproductive organs
9) Demonstration of brain and spinal cord
10) Histology of cornea and retina

Practical Examination Pattern **40 Marks**

1) Gross Anatomy- Discussion of any one specimen 10 Marks
2) Discussion of specimens of Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system
3) Spotters - Cardiovascular system, Respiratory System, Gastrointestinal system, Urinary system, Reproductive system 10x2=20 Marks
4) Histology discussion of any one demonstrated slide 10 Marks

PHYSIOLOGY LABORATORY

1) Haemoglobinometry.
2) Haemocytometry
3) Total leucocyte count.
4) Total Red blood cell count.
5) Determination of blood groups.
6) Differential WBC count.
7) Determination of clotting time, bleeding time.
8) Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume, Calculation of Blood indices: CI, MCH, MCV, MCHC.
9) Blood pressure recording.
10) Spirometery, Artificial Respiration

Practical Examination pattern **40 Marks**

1) Estimation of Hemoglobin. - 10 marks
2) Determination of Blood Groups. - 10 marks
3) Determination of Bleeding and Clotting time. - 10 marks
4) Spotters-Haemocytometer, (Identification of cells) Differential Count, Sphygmomanometer, Spirometer. 10 marks

TOTAL HOURS: 45

BASIC BIOCHEMISTRY LABORATORY

1) General Reactions of Carbohydrates.
2) Color reactions of Proteins.
3) Reactions of Non Protein nitrogenous substances.
4) Demonstration of pH meter, Colorimeter and spectrophotometer.
5) Demonstration of Chromatography and Electrophoresis.

Practical Examination pattern **40 Marks**

1) Identification of Substance of physiological importance 10 Marks
2) Color reactions of Proteins 10 Marks
3) Spotters 10 Marks
4) Charts on Clinical biochemistry 10 Marks

TOTAL HOURS: 45

GENERAL PATHOLOGY

OBJECTIVES

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

1) Describe the scope of pathology
2) Learn basic technical terminology of Haematological Disorders.

UNIT I

Introduction- & scope of pathology **9hrs**

Cell injury and Cellular adaptations - Normal cell, Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia. Inflammation-Introduction, acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation-general features, granulomatous inflammation, tuberculosis. Healing and repair - Definition, different phases of healing, factors influencing wound healing, fracture healing. Hemodynamic disorders-Oedema, hyperemia, congestion, hemorrhage, embolism, thrombosis, infarction. Neoplasia - definition, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions. Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies.

UNIT II

Haematological Disorders **9hrs.**

Introduction and Hematopoiesis. Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency, lab findings, me galoblasticanamia: causes, lab findings, hemolytic anemias: definition. Causes, classification and lab findings. WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias. Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings. Pancytopenia.

UNIT- III

Basic Hematological Techniques **9 hrs**

Characteristics of good technician, Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, patient after care, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions, complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

UNIT IV

Transfusion Medicine **9 hrs**

Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications.

UNIT V

Clinical Pathology **9 hrs**

Introduction to clinical pathology - collection, transport, preservation, and processing of various clinical specimens. Urinalysis - collection. Preservatives, physical, chemical

Examination and microscopy. Physical examination; volume, color, odor, appearance, specific gravity and ph, Chemical examination; strip method- protein - heat and acetic acid test, sulfosalicylic acid method, reducing sugar-benedicts test, ketone bodies - rotheras test, bile pigments fouchet method, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and Schwartz test, bence jones protein., microscopy. Examination of cerebrospinal fluid - physical examination, chemical examination, microscopic examination, examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination, sputum examination.

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions.

1) Basic Pathology Robbins Saunders, an imprint of Elsevier Inc., Philadelphia, USA.
2) Text book of Pathology Harsha Mmohan Jaypee Brothers, New Delhi.
3) Practical Pathology P. Chakraborthy, Gargi Chakarborty New Central book agency,Kolkata.
4) Text book of Hematology Dr Tejinder Singh Arya Publications, Sirmour (H P)
5) Text book of Medical Laboratory Technology Praful Godkar Bhalani Publications house, Mumbai.
6) Textbook of Medical Laboratory Technology RamanikSood.
7) Practical Hematology Sir John Dacie Churchill Livingstone, London.
8) Todd and Sanford, Clinical Diagnosis and Management by Laboratory
9) Methods John Bernard Henry, All India Traveller Booksellers.
10) Histopathology Techniques, Culling.
11) Histopathology Techniques Bancroft.
12) Diagnostic Cytopathology Koss.
13) Diagnostic Cytopathology Winfred Grey.
14) Hand book of Medical Laboratory Technology, CMC Vellore.
15) Basic Hematological Techniques Manipal.

MICROBIOLOGY

OBJECTIVES

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

1) Describe the different types of microorganisms
2) Learn basic technical terminology of Mycobacteriology & Parasitology.

UNIT - I

General Microbiology **9hrs**

Morphology and classification of microorganisms. Growth, nutrition and multiplication of bacteria. Sterilization and Disinfection - Principles and use of equipment's of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants. Immunology - antigen, Antibodies, Immunity, vaccines, types of vaccine and immunization schedule. Hospital acquired infection - Causative agents, transmission methods, investigation, prevention and control of hospital Acquired infections.

UNIT - II

Bacteriology **9hrs**

Classification of bacteria, morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections. Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacteriumdiphtheriae, Clostridia, Enterobacteriaceae - Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas and Spirochetes

UNIT III

Mycobacteriology& Parasitology **9hrs**

Mycobacteria- classification, pathogenesis, lab diagnosis and prevention. Classification, infections and lab diagnosis of following parasites. Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

UNIT IV

Mycology **9hrs**

Morphology, disease caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi (Aspergillus, Zygomycetes and Penicillium)

UNIT V

Virology **9hrs**

General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies and Poliomyelitis

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions.

1) Anathanarayana & Panikar: Medical Microbiology - Revised 8th edition University Press.
2) Parasitology by Chatterjee - Interpretation to Clinical Medicine.
3) Textbook of Microbiology - Baveja, 5th edition, Arya Publications
4) Textbook for Laboratory technicians by Ramnik Sood. Jaypee Publishers
5) Textbook of Parasitology by Paniker. 7th edition

PHARMACOLOGY

OBJECTIVES

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

1) Describe the General Pharmacology and Blood
2) Learn basic technical terminology of Chemotherapy, Hormones.

UNIT I

General Pharmacology, ANS, PNS. **9hrs**

Sources of Drugs. Route of drug administration. Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion). Pharmacodynamics (Mechanisms of action) adverse drug reactions. ANS: ADRENERGIC Drugs - Adrenaline, Noradrenaline, Ephedrine, Dopamine, Dobutamine. Anti-adrenergic - Phentolamine, Phenoxybenzamine, Prazocin, Tamsulosin, Propranolol, Atenolol, Carvidelol. Cholinergic drugs-Acetyl choline, Pilocarpine, Neostigmine, Organ phosphorous compounds. Anti-cholinergic agents-Atropine, Glycopyrrolate, Ipratropium Bromide, Dicyclomine

UNIT II

PNS, CVS, Renal System **9hrs**

Skeletal muscle relaxants - D Tubocurarine, Succinyl choline, Diazepam. Dantroline Local anaesthetics - lignocaine, la + vasoconstrictor CVS - ionotropic agents - Digoxin, Antinational drugs - GTN, Antihypertensive - Beta blockers (Propranolol, Atenolol, carvidelol), CCBs (Nifedeine), Diuretics (Thiazide, Furesemide, ace inhibitors, ARBs, Clonidine Drugs used in treatment of different types of shock, Plasma expanders Renal system - Diuretics Furosemide, Thiazide, Spironolactone Antidiuretics - Vasopressin

UNIT III

CNS, Blood **9hrs**

CNS - general Anaesthetics - nitrous oxide, Halothane, IV anaesthetics. Sedative hypnotics - diazepam, barbiturates, zolpidem. Antiepileptics - Phenytoin, carbamazepine, phenobarbitone, valproate. Opioid analgesics - morphine, pethidine, codeine. NSAIDS - Aspirin, Diclofenacibuprofen, Selective COX2 inhibitors. Respiratory system-treatment of cough And Bronchial asthma. Blood - Hematinic, Anticoagulants - Warfarin, Heparin Thrombolytic& Antiplatelet drugs - streptokinase, aspirin, clopidogrel.

UNIT IV

GIT, Chemotherapy **9hrs**

GIT - drugs used in peptic ulcer - ppi, H2 blockers, Antacids Antiemetics - Metaclopromide, Domperidone, Ondensetron Purgatives & Laxatives-bran, ispaghula, Lactulose, Bisacodyl&senna Drugs used in Diarrhoea- ORS, Super ORS, Ant motility drugs (lope amide, diphenoxylate). Chemotherapy - general considerations MOA, Resistance, Prophylaxis Sulfonamides, cotrimoxazoles, Quinolones Tetracyclines, chloramphenicol. Beta lactam antibiotics

UNIT V

Chemotherapy, Hormones. **9hrs**

Aminoglycosides, Macrolides, other antibiotics (vancomycin, linezolid) & treatment of UTI Antifungal (clotrimazole, flucanozole), Antiviral (Acyclovir, Few drugs used in HAART), Cancer chemotherapy (names, common Adverse effects, general principles in the treatment of cancer) Hormones - Corticosteroids its uses and adverse effects, Treatment of Diabetes mellitus(insulin, Metformin, Glibenclamide).

T: 15+ L: 45 = TOTAL: 60 HOURS

Recommended Books Recent Editions.

1) K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, Emca House, 23/23, Bansari Road, Daryaganj, New Delhi.
2) Padmaja Udaykumar -Pharmacology for Allied Sciences.
3) R.S. Satoskar, S.D. Bhandarkar, S.S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th edition, Single Volume, M/s Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.

PSYCHOLOGY

Objective

1) After studying this applied paper, at the end of the semester students shall be able to demonstrate and develop the skills to understand patients better in the respective field.

UNIT –I **9 hrs**

Introduction to Psychology; Meaning and Definitions psychology. Evolution of modern psychology. Scope of Psychology. Branches of psychology. Concept of normality and abnormality.

UNIT –II **9 hrs**

Identifying psychological disorders. Anxiety disorders (panic, phobia, OCD, PTSD signs symptoms and management).

UNIT –III **9 hrs**

Stress, Hans Selye Model of stress. Lazarus and Folkman model of stress. Sources of stress. Stress, disease and health. Changing health- impairing behavior.

UNIT-IV **9 hrs**

Learning; Meaning, definition, Theories of learning .Pavlov's classical conditioning, Skinner's operant conditioning.

UNIT-V **9 hrs**

Therapeutic Techniques. Counselling-meaning and definition. Psychotherapy- meaning and definition. Relaxation-types. (Brief introduction to psychoanalytical, behavioral and cbt techniques)

TOTAL: 45 HOURS

Recommended Books Recent Editions.

1) C.P. Khokhar (2003) Text book of Stress Coping and Management Shalab Publishing House.
2) S.M.Kosslyn and R.S.Rosenberg (2006) Psychology in Context. Pearson Education Inc.
3) C.R. Carson, J.N. Bitcher, S.Mineka and J.M. Hooley (2007), Abnormal Psychology13th, Pearson Education, Inc.
4) D.A. Barlow and V.M. Durand (2004) Abnormal Psychology Wadsworth, Thompson Learning, 3rd edition USA.
5) R.J .Gerrig& P.G. Zimbardo (2006) Psychology and life, Pearson Education, Inc.
6) Pestonjee, D.M. (1999). Stress & Coping, The Indian Experience 2nd end. New Delhi, Sage India Publications. University Publications, 2015.

INTRODUCTION TO COMPUTER

UNIT I **9 hrs**

Functionalities of a computer, Definition, Advantages, Disadvantages. Applications - Banking, Insurance, Education, Marketing, HealthCare, Engineering Design, Military, Communication, Government. Generations - First Generation, Second Generation, Third Generation, Fourth Generation, Fifth Generation. Types of Computer - PC (Personal Computer), Workstation, Minicomputer, Mainframe, Supercomputer.

UNIT II **9 hrs**

Components - Input Unit, CPU, (Central Processing Unit) Output Unit. CPU - Central Processing Unit, Memory or Storage Unit, Control Unit, ALU (Arithmetic Logic Unit), Arithmetic Section, Section Logic. Input Devices - Keyboard, Mouse, Joystick, Light Pen, Track Ball, Scanner, Digitizer, Microphone, Magnetic Ink, Card Reader (MICR), Optical Character Reader(OCR), Bar Code Readers, Optical Mark Reader(OMR). Output Devices - Monitors, Cathode-Ray Tube (CRT) Monitor, Flat-Panel Display Monitor, Printers, Impact Printers, Character Printers, Dot Matrix Printer, Daisy Wheel, Printers Line, Printer Drum, Printer Chain, impact Non- Printers, Printers Laser, Inkjet Printers.

UNIT III **9 hrs**

Memory - Cache Memory, Primary Memory, (Main Memory)Secondary Memory. Random Access Memory - Static RAM (SRAM), Dynamic RAM (DRAM). Read Only Memory - MROM (Masked ROM), PROM (Programmable Read only Memory), EPROM (Erasable and Programmable Read Only Memory)EEPROM (Electrically Erasable and Programmable Read Only Memory) Advantages of ROM. Mother board - Features of Mother board, Popular Manufacturers, Description of Mother board.

UNIT IV **9 hrs**

Ports - Port Serial, Port Parallel, Port PS/2, Port VGA, Power Connector, Port Firmware, Port Modem, Ethernet Port, Port Game, Digital Video Interface, DVI port, Sockets. Hardware - Relationship between Hardware and Software. Software - System Software, Application Software

UNIT V **9 hrs**

Number System - Decimal Number System, Binary Number System, Octal Number, Hexadecimal Number System. Data and Information - Data Processing Cycle. Networking - Characteristics of Computer Network, Cables, Router, Network Card, Internal Network Cards, External Network Cards. Operating System - Objectives of Operating System, Characteristics of Operating System. Internet and Intranet - Similarities in Internet and Intranet, Differences in Internet and Intranet. Computer Viruses - Types of computer virus, Use of Antivirus software

TOTAL HOURS: 45

GENERAL PATHOLOGY LABORATORY

1. Laboratory organization.
2. Reception of specimen, dispatch of reports, records keeping, coding of cases.
3. Laboratory safety guidelines.
4. SI units and conventional units in hospital laboratory.
5. Haematology techniques
6. Basic requirements for hematology laboratory
7. Glasswares for hematology
8. Equipments for haematology.
9. Anticoagulant vials
10. Complete blood counts.

11. Determination of haemoglobin.
12. RBC count and TLC by hemocytometer.
13. Differential leukocyte count.
14. Determination of platelet count
15. Determination of ESR and PCV.
16. Erythrocyte Indices - MCV, MCH, MCHC.
17. Reticulocyte count
18. Absolute eosinophilia count
19. Morphology of blood cells
20. Uri analysis
21. Examination of cerebrospinal fluid
22. Examination of body fluids (pleural, pericardial, peritoneal)
23. Sputum examination.

Practical Examination Pattern **40 marks.**

1) Spotters 10 marks.
2) Estimation of Haemoglobin or blood grouping 10 marks.
3) Urine analysis 10 marks.
4) Determination of ESR and PCV 10 marks.

TOTAL HOURS: 45

MICROBIOLOGY LABORATORY

1) Compound microscope and its application in microbiology.
2) Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, MacConkey agar with LF & NLF, Nutrient agar with staph colonies. Anaerobic culture, Methods and Antibiotic susceptibility test.
3) Demonstration of common serological tests: Widal, VDRL, ASLO, CRP, RF, Rapid tests for HIV, Hbsag and HCV.
4) Grams staining.
5) Acid fast staining.
6) Principles and practice of Biomedical waste management.
7) Stool Microscopy.

Practical Examination Pattern **40 marks.**

1) Spotters (10 spotters carrying 2 marks each) 20 marks
2) Culture media - 6
3) Equipment's - 2
4) Slides - 2
5) Discussion:
    a) Gram stain 10 marks
    b) Ziehl – Neelsen Stain 10 marks

TOTAL HOURS: 45

PHARMACOLOGY LABORATORY

1. Dosage forms
2. Solid Dosage forms
3. Liquid Dosage forms
4. Gaseous Dosage forms
5. Oral route
6. Parentral routes
7. Novel routes
8. Fixed dose combination - Amoxicillin + clavulinic acid - cotrimoxazole, Lignocaine + Adrenaline
9. Drug stations - Adrenaline, dopamine, Dobutamine)
10. Drug stations - Corticosteroids (hydrocortisone, prednisolone, inhalational steroids)Drug stations - common antibiotics (amoxicillin, ciprofloxacin, Azithromycin, Metronidazole, Cephalosporins)
11. Drug stations - Insulin preparations
12. Instrument & devices (Nasogastric tube, laryngoscope, Different Cathetors, nebulizers, Inhalers, Rotahalers)

Practical Examination Pattern **40 marks.**

1) Dosage Forms : 15 Marks (5 X 3)
   Capsules, Tablets, Syrup, Iv, Im, Sc, Ia, Intra Articular - Advantages (1 Mark), Disadvantages (1 Mark) Examples (1 Mark)
2) Mention the name of the Device / Instruments and uses : 15 marks (5X3) Inhalers, Rota halers, Spacehalers, Drip sets, Vasofix, ryles tube, urinary catheter, Endotrachealtube, Hand gloves
3) 10 Spotters : 10 marks (10X 1) 2 uses of preparation

APPLIED PATHOLOGY

Unit I **9hrs**

* Atherosclerosis-definition, risk factors, pathogenesis, morphology and complications
* Ischemic heart disease: Myocardial infarction - definition, pathogenesis, morphology and complications
* Hypertension- Benign and malignant hypertension: pathogenesis, pathology and complications

Unit II **9hrs**

* Heart failure - Right and left heart failure: causes, pathophysiology and morphology
* Rheumatic heart disease and infectious endocarditis - definition, etiopathogenesis, morphology and complications
* Congenital heart disease- Types and atrial septal defect; aneurysms - types and morphology; cardiomyopathies in brief

Unit III **9hrs**

* Atelectasis - types, Adult respiratory distress syndrome - causes , pathogenesis and morphology; pulmonary edema- classification, causes and morphology
* Chronic obstructive pulmonary disease- Chronic bronchitis, emphysema, asthma, bronchiectasis: Definition, etiopathogenesis and morphology
* Restrictive pulmonary diseases - Definition, categories, pathogenesis and morphology

Unit IV **9hrs**

* Pneumoconiosis - types, asbestosis, coal workers pneumoconiosis - etiopathogenesis and morphology
* Pulmonary embolism, infarction, pulmonary hypertension - Definition, etiopathogenesis and morphology
* Pneumonia - Classification of pneumonias; Lobar pneumonia and bronchopneumonia - etiology, pathology and complications

Unit V **9hrs**

* Clinical manifestations of renal diseases
* Glomerular lesions in systemic diseases - diabetes, amyloidosis and systemic lupus erythematous
* Pericardial and pleural effusions - causes and microscopy

L: 45 + T: 15 = TOTAL: 60 HOURS

Reference Books (latest edition)

1 Basic Pathology Robbins Saunders an imprint of Elsevier Inc., Philadelphia, USA
2 Text book of Pathology Harsh Mohan Jaypee Brothers, New Delhi
3 Practical Pathology P. Chakra borty, Gargi Chakraborty New Central Book Agency,Kolkata
4 Text Book of Hematology Dr.Tejinder Singh Arya Publications, Sirmour (H.P)
5 Text Book of Medical Laboratory Technology PrafulGodkar, Bhalani Publication House, Mumbai

APPLIED MICROBIOLOGY

Unit I

- Sterilization and disinfection **9hrs**
- Sterilization and disinfection - classification, principle, methods
- Central sterile supply department

Unit II

Importance of sterilization and disinfection **9hrs**

- Disinfection of instruments used in patient care
- Disinfection of patient care unit
- Infection control measures for ICUs

Unit III

Health care associated infections **9hrs**

- Surgical site infections
- Urinary tract infections
- Ventilator associated pneumonia
- Catheter associated blood stream infections
- Antibiotic associated diarrhea

Unit IV

Drug resistant bacteria **9hrs**

MRSA
VRE
Drug resistant Gram negative bacteria

Unit V

Occupationally acquired infections and its prevention **9hrs**

a. Respiratory route - Tuberculosis, Varicella zoster virus, Influenza, RSV
b. Blood borne route - HIV, HBV, HCV, CMV, Ebola
c. Or fecal route - Salmonella, Hepatitis A
d. Direct contact - Herpes virus

L: 45 + T: 15 = TOTAL: 60 HOURS

Reference Books (latest edition)

1. Textbook of Microbiology by Ananthnarayan and Paniker.
2. Textbook of Hospital Infection Control by Purvamathur.
3. Textbook of Microbiology by Baveja.
4. Hospital Infection Control by Mayhill.

BASIC CARDIAC CARE TECHNOLOGY

Unit I

Applied Anatomy and Physiology - 9hrs

1. Applied Anatomy
   a) Structure of the heart and gross anatomy, normal position situssolitus, situs inverses with dextrocardia, situssolitus with dextrocardia, situsinversus with levocardia.
   b) Systemic and pulmonary circulation, coronary structure, coronary sinus structure and circulation.
   c) Chest topography - identification of imaginary lines, topographical landmarks over thorax, topography of heart and lungs.
   d) Surface marking of heart, aorta, pulmonary artery, precordium, heart valves, subclavian.
2. Applied Physiology
   a) Control of heart rate.
   b) Concepts of congenital heart (ASD, VSD, PDA, TOF and transpositions).
   c) Blood circulation, cardiac output, pulmonary circulation, pulmonary oedema
   d) Concepts of myocardial functions.
   e) Control of circulation
   f) Conduction system of the heart

Unit II

Noninvasive ECG and TMT - 9hrs

ECG
   a) Technique of ECG recording
   b) ECG Leads system
   c) ECG waves - PQRSTU, Osborn wave, delta wave, epsilon wave.
   d) ECG rates, rhythm, axis calculation, lead positioning.
   e) Intervals and segments - PR interval, PR segment, ST segment, QT interval, J point and QRS complex.
   f) ECG anatomy - Chambers enlargement.
   g) Technical artefacts
   h) ECG reporting

TMT

   a) - pretest ECG, Introduction to Treadmill Test - Indications and Safety, equipment and Protocols, exercise End Points, basics of Interpretation of the Exercise Test.
   b) Exercise Testing to Diagnose Obstructive Coronary Artery Disease - Rationale and Guidelines, Pretest Probability (true positive, false positive, true negative and false negative ST-Segment Interpretation, Confounders of Stress ECG Interpretation.
   c) Result Reporting

Unit III

Noninvasive Echocardiography - 9hrs

   a) Introduction and purposes, demonstration of machine parts,
   b) Basic windows
   c) Echocardiographic views
   d) Imaging modes - two-dimensional (2D) imaging, M-mode imaging, and Doppler imaging, color - flow mapping.

Unit IV

Invasive technologies - 9hrs

a) Orientation to the Cath - Lab and biomedical equipments, Introduction and purposes of the Cath - Lab.
b) Radiation safety and protocols.
c) Vascular access - arterial in femoral, radial and ulnar, venous in femoral.
d) Catheterization left heart and right heart, Angiography - Chambers.
e) Transducers balancing, measurement of pressures, Calculations of gradients
f) Blood flows, cardiac output and Calculations of cardio shunts, resistances.
g) Management of patient in the Cath - Lab, coronary angiogram views.
h) Prerequisites of cat lab procedures: CBC, RFT, Serology, ECG, Echo, and customized list for all types of procedures.
i) Maintaining sterility, PPE - Personnel protective equipments.

Unit V

Gas Administration Devices - 9hrs

3. Gas administration devices (reducing valves, flow meters and regulators).
   a) Simple oxygen administration devices.
   b) Methods of controlling gas flow.
   c) Reducing valve, Flow meters, restrictors and regulators
   d) Selection of device
   e) Precautions, advantages and disadvantages

L: 45 + T: 15 = TOTAL: 60 HOURS

Reference Books (latest edition)

1. Hutchison's Clinical Methods
2. A text book of Electrocardiography - Goldberger
3. Nanda's A Text book of Echocardiography
4. A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
5. A Text book of Cardiovascular Medicine. Dr.Bruanwald's
6. A Text book of Medicine, Davidsons

INTRODUCTION TO BIOMEDICAL INSTRUMENTATION

Unit I 9hrs

Fundamentals of Medical Instrumentation: What is Biomedical Engineering? Anatomy and Physiological systems of the body, Sources of biomedical signals, Basic Medical Instrumentation System, Performance Requirement of Medical Instrumentation System, Intelligent Medical Instrumentation System, General Constraints in design of Medical Instrumentation System, Types of Biomedical Instrumentation Systems.

Unit II 9hrs

Bioelectric Signals and Electrodes: Origin of Bioelectric Signals, Bioelectric Signals – Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG),

Electroretinogram (ERG), Electrooculogram (EOG). Purpose of Electrode paste, Electrodes for ECG, EEG and EMG.

Unit III **9hrs**

Modern Imaging Systems: basic concepts and fundamentals of – X-ray machines, Computed Tomography, Nuclear Medical Imaging system, Magnetic Resonance Imaging system, ultrasonic Imaging system, Thermal Imaging system.

Unit IV **9hrs**

Therapeutic Equipment: basic concepts and fundamentals of – Cardiac Pacemaker, Cardiac Defibrillators, Physiotherapy and Electrotherapy Equipment, Haemodialysis Machines, Lithotriptors, Anaesthesia Machine, Ventilators, Radiotherapy Equipment, Automated Drug delivery systems.

Unit V **9hrs**

Recent Trends in Biomedical: Basic concepts and Applications in Biomedical- LASER, BIOMEMS and Nano Technology, Biomaterials and Implants, Artificial Organs, Rehabilitation Engineering.

TOTAL: 30 HOURS

TEXT BOOKS:

1. Leslie Cromwell, "Biomedical Instrumentation and measurement", Prentice hall of India, New Delhi, 1997.

2. Khandpur R.S, "Handbook of Biomedical Instrumentation", Tata McGraw-Hill, New Delhi, 1997.

REFERENCES:

1. John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 1998.

2. Joseph J.carr and John M. Brown, "Introduction to Biomedical equipment technology", John Wiley and sons, New York, 1997.

HEALTH CARE

Unit I **9hrs**

1a. Concepts of Health

Definition of health; evolution in concepts of public health; public health events- sanitary awakening, germ theory of disease, rise of public health in various

Countries, changing concepts of health- biomedical concept, ecological concept, psycho-social concept and holistic concept.

1b. Dimensions of Health

Physical dimension, mental dimension, Social dimension etc; Common health problems in India - Communicable diseases, Non communicable diseases, MCH problems, Nutritional problems, Environmental sanitation, Glance over National Health profile.

Unit II **9hrs**

2a Evolution of health care delivery systems

History of health care delivery services; Genesis of primary health care; National health policy; MDGs.

2b Levels of health care

Primary health care, secondary health care, tertiary health care.

Primary health care-principles of primary health care, elements of primary health care.

Unit III **9hrs**

3a Primary health care: Delivery of services

Introduction; Structure of health care delivery system; Delivery of primary health care services at village level; Village health guide, ASHA, ICDS: Subcentre: Primary health centre.

3b Secondary and tertiary health care: Delivery of services

Community Health centre; First referral unit; District hospital.

Unit IV **9hrs**

4a Primary health care - Current status in India

Status of health care infrastructure; Health team concept; Health insurance; Social security and social assistance in health; AYUSH.

4b National Health Programmes

Introduction; National Vector Borne Disease Control Programme; National Leprosy Eradication Programme; Revised National Tuberculosis Control Programme; National AIDS Control Programme; Universal Immunization Programme; National Rural Heath Mission.

Unit V **9hrs**

5a National Health Programmes

Reproductive and Child Health Programme; Integrated Management of Neonatal and Childhood Illnesses; National Nutritional Anemia Prophylaxis Programme; National Programme for Control of Blindness; National Cancer Control Programme; National Mental Health Programme.

5b First aid

Basic terminologies; general guidelines; first aid in specific situations; Wound, bleeding, fracture, choking, burns, epistaxis, strains and sprain, animal bites (classification, causes and first aid), Cardio-pulmonary resuscitation

TOTAL: 45 HOURS

Recommended Books Recent Editions.

1. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers, 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 4th edition
3. Bhalwar R editor. Textbook of Public Health and Community Medicine. 2nd Pune, Department of Community medicine AFMC; 2012
4. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015

APPLIED PATHOLOGYLABORATORY

practical:

1. Urine examination: physical, chemical, microscopy
2. Blood grouping & Rh typing
3. Hemoglobin estimation, packed cell volume (PCV), erythrocyte sedimentation rate (ESR)
4. Charts
5. Specimens

   * Atherosclerosis
   * Pneumonia
   * Tuberculosis
   * Infarct - lung
   * Contracted kidney
   * Hydronephrosis

TOTAL: 45 HOURS

APPLIED MICROBIOLOGYLABORATORY

Practical;

1. Sterilization and disinfection practices in tertiary care hospital
2. Quality control of sterilization and Interpretation of results of sterility testing
3. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.
4. Preparation of materials for autoclaving - packing of materials, loading, holding time and unloading
5. Disinfection of wards, operation theatres and laboratory and air sampling methods

Practical Examination Pattern

1. Sterilization and disinfection practices in tertiary care hospital and quality control of sterilization and Interpretation of results of sterility testing. 20 Marks
2. Preparation of materials for autoclaving - packing of materials, loading, holding time and unloading. 10Marks
3. Disinfection of wards, operation theatres, dialysis units and laboratory and air sampling methods. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing. 10Marks

TOTAL: 45 HOURS

BASIC CARDIAC CARE TECHNOLOGY LABORATORY

Practical:

1. History taking
2. Clinical Examination: General Physical Examination and assessment of vital signs
3. Clinical Examination: Basic Systemic Examination
4. Conversion between different units
5. Identifying the types of medical gas supply and its advantages/disadvantages
6. Devices: Sphygmomanometer, thermometer, pulse oximeter, simple oxygen delivery devices

TOTAL: 45 HOURS

PATIENT CARE AND BASIC NURSING

Objectives:
To learn about patient care and basics of nursing activities, communication and documentation, infection control, medication administration and wound care.

Unit I - **9**

Introduction, Communication and Documentation - 12 hours

1. Introduction to Patient Care:

a) Principles of patient care
b) Types of patients (gender, age, diseases, severity of illness, triage)

2. Communication & Documentation:

a) Communication with doctors, colleagues and other staffs.
b) Non-verbal communication, Inter-personnel relationships.
c) patient contact techniques, communication with patients and their relatives

3. Documentation:

a. Importance of documentation,
b. initial and follow up notes;
c. documentation of therapy, procedures and communication

Unit II - **9**

Universal Precautions and Infection Control - 10 hours

4. Universal Precautions and Infection Control:

a) Hand washing and hygiene.
b) Injuries and Personal protection, Insulation and safety procedures.
c) Aseptic techniques, sterilization and disinfection.
d) Disinfection and Sterilization of devices and equipment
e) Central sterilization and supply department
f) Biomedical Medical waste management

Unit III - **9**

Medication Administration and Transport of patient - 14 hours

5. Medication Administration:

a) Oral / Parenteral route
b) Parenteral medication administration: Intra venous, intra muscular, sub-cutaneous, intra dermal routes, Intra venous Infusion
c) Aerosol medication administration, Oxygen therapy
d) Intravenous fluids,
e) Blood and blood component transfusion

6. Position and Transport of patient:

a) Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.

b) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
c) Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV - **9**

Bedside care and monitoring - 14 hours

7. Bedside care:

a) Methods of giving nourishment: feeding, tube feeding, drips, transfusion.
b) Recording of pulse, blood pressure, respiration, saturation and temperature.
c) Bed side management: giving and taking bed pan, urine container.
d) Observation of stools, urine, sputum, drains
e) Use and care of catheters and rubber goods.
f) Care of immobile/bed ridden patients, bed sore and aspiration prevention

8. Monitoring of Patient:

a) Pulse, ECG (Cardiac Monitor), Oxygen Saturation, Blood Pressure, Respiration
b) Multi parameter monitors, Capnography and End Tidal CO2 (ETCO2)
c) Hydration, intake and output monitoring
d) Monitoring ventilator parameters: Respiratory Rate, Volumes, Pressures, Compliance, Resistance

Unit V - **9**

Wound care and first aid - 10 hours

9. Dressing and wound care:

a) Bandaging: basic turns, bandaging extremities, triangular bandages and their application.
b) Surgical dressing: observation of dressing procedures.
c) Suture materials and suturing techniques
d) Splinting
e) Basic care of patient with burns

10. First Aid and Basic Life Support (BLS)

Reference Books (latest edition)

1. Principles and Practice of Nursing - Sr Nancy
2. Introduction to Critical Care Nursing - Mary Lou Sole
3. First Aid - Redcross Society Guidelines
4. Basic Life Support (BLS) - American Heart Association Guidelines

L: 45 + T: 15 = TOTAL: 60 HOURS

BASICS CARDIAC EVALUATION AND THERAPIES

Unit I **9hrs**

Heart diseases and related disorders - 14 Hours

a) Ischaemic heart disease
b) Rheumatic heart disease
c) Congenital heart disease
d) Arrhythmias
e) Peripheral vascular disease
f) Pericardial disease
g) Shock state
h) Cardiomyopathy

i) Hypertension, diabetes, dyslipidaemias
j) Infective endocarditis
k) Heart failure
l) Pulmonary hypertension and embolism

Unit II **9hrs**

Cardiovascular investigations: Noninvasive - 14 Hours

a) ECG - cardiac diagnosis by ECG: Chambers enlargement, arrhythmias, myocardial ischemia and infarction.
b) Echocardiography - cardiac diagnosis: valvular heart diseases, myocardial diseases, ischaemic heart diseases, Cardiomyopathies
c) Pulmonary hypertension, infective endocarditis, intracardiac masses.
d) Stress test- treadmill test review, pharmacological stress testing.
e) 24 hours Holter monitoring
f) Ambulatory BP monitoring
f) Tilt table test
g) Ankle-Brachial Index

Unit III **9hrs**

Cardiovascular investigations: Invasive - 10 Hours

a) Diagnosis of coronary artery disease
b) Diagnosis of valvular heart diseases in the cath-lab - stenosis, regurgitation and mixed
c) Diagnosis of shunts
d) Evaluation of pulmonary hypertension
e) Diagnosis of pericardial constriction
f) Diagnosis of peripheral and aortic diseases
g) Complications of cardiac catheterization
g) Complications and management of Contrast

Unit IV **9hrs**

Cardiovascular pharmacological therapies - 12 hours

a) Antiplatelet
b) Anticoagulants
c) Antiarrhythmic
d) Antihypertensive
e) Intravenous fluids
f) Atropin
g) Inotropics
h) 2B 3A receptors blocking agents
I) Diuretics
j) Nitrates
k) miscellaneous

Unit V **9hrs**

Cardiovascular interventional therapies - 10 hours

a) Coronary angioplasty
b) Peripheral angioplasty

c) Mitral valvoplasty
d) Pulmonary and aortic valvuplasty
e) Device closures
f) Pacemakers
g) Pericardiocentesis
h) Myocardial biopsy
i) Retrieval of foreign bodies
j) Clot aspiration

L: 45 + T: 15 = TOTAL: 60 HOURS

Reference Books (latest edition)

1 A text book of Electrocardiography - Goldberger
2 Nanda's A Text book of Echocardiography
3 A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
4 A Text book of Cardiovascular Medicine. Dr.Bruanwald's
5 A Text book of Medicine. Davidsons

BASICS OF MEDICAL DISORDERS

Objective:
To learn about basic concepts of common medical disorders and its therapeutic options.

Unit I

Cardiac and Respiratory diseases **9hrs**

1. Cardio vascular diseases
   a. Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias
   b. Heart failure, shock - types, causes
2. Respiratory diseases
   a. Pneumonia, tuberculosis,
   b. Chronic obstructive pulmonary disease, asthma
   c. Pleural effusion, pneumothorax
   d. Interstitial lung disease

Unit II **9hrs**

Neurological, Renal, GI and infectious diseases

3. Neurological diseases
   a. Polio myelitis, GullianBarre Syndrome, Myasthenia Gravis, epilepsy / seizure disorder, cerebro vascular accident / stroke
4. Renal Diseases
   a. Acute kidney injury
   b. Chronic Kidney Disease
5. Gastro intestinal and Liver Diseases
   a. Gastritis / APD, peptic ulcer
   b. Acute gastroenteritis
   c. Hepatitis, Hepatic failure, alcoholic liver disease
6. Infectious diseases: Dengue, malaria, leptospirosis

Unit III **9hrs**

Blood, fluid, electrolyte and acid base abnormalities Blood loss and Anemia, thrombocytopenia

7. Fluid Electrolyte imbalance and corrective methods
8. Acid Base abnormalities and corrective methods

Unit IV **9hrs**

Pulmonary Oedema, Sepsis and MODS - 10 hours

10. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome
11. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome

Unit V **9hrs**

Health problems in Specific conditions and Toxicology

12. Health problems in specific conditions
    a. Pregnancy - antenatal care, disorders in pregnancy
    b. Children and new born
    c. Obesity
    d. Diabetes mellitus
    e. HIV infections and AIDS
    f. Elderly subjects and disability
    g. Brief mention about endocrine disorders
13. Poisoning and drug over dosing
    a. Classification of poisons
    b. Principles of treatment of poisoning and Primary care
    c. Poisons and drug over dosing requiring ventilation
14. Miscellaneous
    a. Drowning
    b. Hanging

L: 45 + T: 15 = TOTAL: 60 HOURS

Recommended Books Recent Editions.

1. Davidson's Principles and Practice of Medicine - Elsevier Publications
2. Harrison's Principle of Internal Medicine

BIOSTATISTICS AND RESEARCH METHODOLOGY

Learning Objectives

1. To have a basic knowledge of biostatistics and its applications in medicine
2. To know various types of data presentation and data summarization in Medical field
3. To have overview of data analysis and sampling techniques
4. To understand various study designs in Medical field
5. To know applications of various study designs in Medical Research

Unit I-

Introduction and Presentation of data **6hrs**

Meaning, Branches of Statistics, Uses of statistics in medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.

Measures of central tendency and Measures of Variation

Arithmetic Mean (Mean), Median, Mode, Partition values, Range, Interquartile range , Mean Deviation, Standard Deviation, Coefficient of Variation.

Unit II **6hrs**

Probability and standard distributions

Definition of some terms commonly encountered in probability, Probability distributions; Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality; Skewness and kurtosis

Census and Sampling Methods

Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience sampling, Consecutive Sampling, Quota sampling, Snowball sampling, Judgmental sampling or Purposive sampling, Volunteer sampling, Probability (Random) Sampling methods; Simple random sampling, Systematic Sampling, Stratified Sampling, Cluster sampling, Multi-stage sampling, Sampling error, Non-sampling error.

Unit III **6hrs**

Inferential statistics

Parameter and statistic, Estimation of parameters; Point estimation, Interval Estimation, Testing of hypothesis; Null and alternative hypotheses, Type-I and Type-II Errors.

Unit IV **6hrs**

Introduction to research methodology

Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.

Study Designs-Observational Studies

Epidemiological study designs; Observational studies, Descriptive studies; Case reports, Case series, Analytical studies; Case control studies, Cohort studies, Cross sectional

Unit V **6hrs**

Experimental Studies

Experimental studies (Interventional studies); Randomized control Trials (Clinical trials), Field trials, Community trials, Nm-Randomized Trials

Uses of Epidemiology, Application of study Designs in Medical Research

TOTAL: 30 HOURS

References

1. K.R.Sundaram, S.N.Dwivedi and V Sreenivas (2010), Medical statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi
2. NSN Rao and NS Murthy (2008), Applied Statistics in Health Sciences, Second Edition, Jaypee Brothers Medical Publishers (P) Ltd.
3. J.V.Dixit and L.B.Suryavanshi (1996), Principles and Practice of Biostatistics, First Edition, M/S BanarsidasBhanot Publishers.
4. GetuDegu and FasilTessema (2005), Biostatistics, Ethiopia Public Health Training Initiative.
5. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.

CONSTITUTION OF INDIA

Unit – I **9hrs**

Meaning of the term 'Constitution', Making of the Indian Constitution 1946-1950, The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

Unit - II **9hrs**

Fundamental rights and duties their content and significance, Directive principles of States, policies the need to balance fundamental rights with directive principles Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

Unit – III **9hrs**

Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India, The Election Commission and State Public Service commissions.

Unit – IV **9hrs**

Method of amending the Constitution, Enforcing rights through writs

Unit – V **9hrs**

Constitution and sustainable development in India.

TOTAL: 45 HOURS

PATIENT CARE AND BASIC NURSING LABORATORY

PRACTICAL:

1. Demonstration of Patient care Procedures:
   a) Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding
   b) Phlebotomy and obtaining blood samples, Arterial Blood sampling for ABG
   c) Injections: intra muscular, intra venous, sub cutaneous, intra dermal
   d) Insertion of intra venous catheter and infusion of medications, blood transfusion
   e) Recording of ECG and monitoring of patient
   f) Oxygen therapy: oxygen cannula, masks. Aerosol therapy: nebulization, inhalers
   g) Suctioning and care of artificial airway
   h) Insertion of urinary bladder catheter
2. Uses, principles, advantages and disadvantages of instruments and Devices in patient care
3. First aid and Basic Life Support (BLS)

Practical Exam Pattern:

Spotters, Drugs, Instruments and devices - identification and usage, demonstration of patient care procedures.

TOTAL: 45 HOURS

BASICS CARDIAC EVALUATION AND THERAPIES LABORATORY

Practicals:

Non invasive Technology;

a) ECG recording basic
b) ECHO evaluation basic
c) Preparation for treadmill test
d) Preparation for 24 hours Holter monitoring
e) Preparation for ABPM

Invasive Technology;

a) Cardiac Cath right Heart
b) Cardiac Cath Left Heart
c) Cardiovascular Angiography
d) Cardiac Pacing
e) Relevant instrumentation in Cath Lab
e) Cardiac Emergencies in Cath Lab

Practical Exam Pattern:

1) Spotters -20 marks
   a) Instruments and consumables
   b) Pharmacology of cardio vascular Drugs
   c) Devices

TOTAL: 45 HOURS

BASICS OF MEDICAL DISORDERS LABORATORY

Practical:

1. History Taking and clinical examination, monitoring of patient.
2. Therapeutic options for various diseases and conditions

Practical Exam Pattern:

* Spotters-20 marks
  Drugs, Instruments and devices
  X rays, Basic Blood investigation reports
* Case Discussion- 10 marks
* Demonstration of Procedures- 10 marks

TOTAL: 45 HOURS

SEMESTER V

THEORY

CARDIAC EVALUATION AND THERAPIES - I

AIM:

To learn about heart diseases and related disorders. To learn the concepts of cardiovascular - investigations and therapies.

OBJECTIVE:

The course enables the students to understand clinical disorders and drugs related to heart, invasive and noninvasive investigations and cardiac monitoring.

OUTCOMES:

- The students should learn about various cardiac disorders
- Study about drugs related to heart
- Learn about patient monitoring in cardiac care
- Know about various non invasive cardiac investigations
- Know about various invasive cardiac investigations

UNIT-I Clinical Disorders of Heart 9

Clinical presentation, evaluation and management of acute coronary syndromes - Clinical presentation, evaluation and management of stable ischemic heart disease - Hypertension, diagnosis, complications and management - Cardiac arrhythmia, presentation, diagnosis and management) Heart failure, classification, diagnosis and management - Valvular heart diseases.

UNIT-II Drugs Related to Heart 9

Antiplatelets drugs - Antiischaemic drugs - Thrombolytic drugs - Antiarrhythmic drugs - antihypertensive drugs - antiarrhythmic drugs.

UNIT-III Patient Monitoring in Cardiac Care 9

Cardiac Rhythm and rate - Trans-cutaneous oxygen monitors and Pulse oximeters - Invasive hemodynamic monitoring - Multi parameter monitoring - Monitoring response to therapy and progression of disease - Ambulatory BP monitoring.

UNIT-IV Cardiovascular investigations: Noninvasive 9

ECG - Review of ECG patterns in ischaemic heart diseases, hypertensive heart disease - Stress test- treadmill test review, pharmacological stress testing - 24 hours Holter monitoring.

UNIT-V Cardiovascular investigations: Invasive 9

Coronary angiography - Diagnosis of mitral stenosis, regurgitation and mixed - Diagnosisof shunts A review - Diagnosis of peripheral and aortic diseases - Complications of cardiac catheterization - Contrast induced nephropathy prevention and management

Unit III **9hrs**

Blood, fluid, electrolyte and acid base abnormalities Blood loss and Anemia, thrombocytopenia

9. Fluid Electrolyte imbalance and corrective methods
10. Acid Base abnormalities and corrective methods

Unit IV **9hrs**

Pulmonary Oedema, Sepsis and MODS - 10 hours

15. Pulmonary Oedema, Acute Lung Injury and Acute Respiratory Distress Syndrome
16. Sepsis, multi-organ failure, Multi-organ dysfunction syndrome

Unit V **9hrs**

Health problems in Specific conditions and Toxicology

17. Health problems in specific conditions
    a. Pregnancy - antenatal care, disorders in pregnancy
    b. Children and new born
    c. Obesity
    d. Diabetes mellitus
    e. HIV infections and AIDS
    f. Elderly subjects and disability
    g. Brief mention about endocrine disorders
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    a. Classification of poisons
    b. Principles of treatment of poisoning and Primary care
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    a. Drowning
    b. Hanging

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Unit III **6hrs**

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Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.

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Unit V **6hrs**

Experimental Studies

Experimental studies (Interventional studies); Randomized control Trials (Clinical trials), Field trials, Community trials, Nm-Randomized Trials

Uses of Epidemiology, Application of study Designs in Medical Research

TOTAL: 30 HOURS

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9. GetuDegu and Fasil Tessema (2005), Biostatistics, Ethiopia Public HealthTraining Initiative.
10. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.

CONSTITUTION OF INDIA

Unit – I **9hrs**

Meaning of the term 'Constitution', Making of the Indian Constitution 1946-1950, The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

Unit - II **9hrs**

Fundamental rights and duties their content and significance, Directive principles of States, policies the need to balance fundamental rights with directive principles Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

Unit – III **9hrs**

Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India, The Election Commission and State Public Service commissions.

Unit – IV **9hrs**

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Unit – V **9hrs**

Constitution and sustainable development in India.

TOTAL: 45 HOURS

PATIENT CARE AND BASIC NURSING LABORATORY

PRACTICAL:

1. Demonstration of Patient care Procedures:
   a) Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding
   b) Phlebotomy and obtaining blood samples, Arterial Blood sampling for ABG
   c) Injections: intra muscular, intra venous, sub cutaneous, intra dermal
   d) Insertion of intra venous catheter and infusion of medications, blood transfusion
   e) Recording of ECG and monitoring of patient
   f) Oxygen therapy: oxygen cannula, masks. Aerosol therapy: nebulization, inhalers
   g) Suctioning and care of artificial airway
   h) Insertion of urinary bladder catheter
2. Uses, principles, advantages and disadvantages of instruments and Devices in patient care
3. First aid and Basic Life Support (BLS)

Practical Exam Pattern:

Spotters, Drugs, Instruments and devices - identification and usage, demonstration of patient care procedures.

TOTAL: 45 HOURS

BASICS CARDIAC EVALUATION AND THERAPIES LABORATORY

Practical:

Non invasive Technology;

a) ECG recording basic
b) ECHO evaluation basic
c) Preparation for treadmill test
d) Preparation for 24 hours Holter monitoring
e) Preparation for ABPM

Invasive Technology;

f) Cardiac Cath right Heart
g) Cardiac Cath Left Heart
h) Cardiovascular Angiography
i) Cardiac Pacing
j) Relevant instrumentation in Cath Lab
e) Cardiac Emergencies in Cath Lab

Practical Exam Pattern:

2) Spotters -20 marks
a) Instruments and consumables
b) Pharmacology of cardio vascular Drugs
c) Devices

TOTAL: 45 HOURS

BASICS OF MEDICAL DISORDERS LABORATORY

Practical:

3. History Taking and clinical examination, monitoring of patient.
4. Therapeutic options for various diseases and conditions

Practical Exam Pattern:

* Spotters-20 marks
  Drugs, Instruments and devices
  X rays, Basic Blood investigation reports
* Case Discussion- 10 marks
* Demonstration of Procedures- 10 marks

TOTAL: 45 HOURS

SEMESTER V

THEORY

CARDIAC EVALUATION AND THERAPIES - I

To learn about heart diseases and related disorders. To learn the concepts of cardiovascular - investigations and therapies.

OBJECTIVE:

The course enables the students to understand clinical disorders and drugs related to heart, invasive and noninvasive investigations and cardiac monitoring.

OUTCOMES:

- The students should learn about various cardiac disorders
- Study about drugs related to heart
- Learn about patient monitoring in cardiac care
- Know about various non invasive cardiac investigations
- Know about various invasive cardiac investigations

UNIT-I **Clinical Disorders of Heart** **9**

Clinical presentation, evaluation and management of acute coronary syndromes - Clinical presentation, evaluation and management of stable ischemic heart disease - Hypertension, diagnosis, complications and management - Cardiac arrhythmia, presentation, diagnosis and management) Heart failure, classification, diagnosis and management - Valvular heart diseases.

UNIT-II **Drugs Related to Heart** **9**

Antiplatelets drugs - Antiischaemic drugs - Thrombolytic drugs - Antiarrhythmic drugs - antihypertensive drugs - antiarrhythmic drugs.

UNIT-III **Patient Monitoring in Cardiac Care** **9**

Cardiac Rhythm and rate - Trans-cutaneous oxygen monitors and Pulse oximeters - Invasive hemodynamic monitoring - Multi parameter monitoring - Monitoring response to therapy and progression of disease - Ambulatory BP monitoring.

UNIT-IV **Cardiovascular investigations: Noninvasive** **9**

ECG - Review of ECG patterns in ischemic heart diseases, hypertensive heart disease - Stress test- treadmill test review, pharmacological stress testing - 24 hours Holter monitoring.

UNIT-V **Cardiovascular investigations: Invasive** **9**

Coronary angiography - Diagnosis of mitral stenosis, regurgitation and mixed - Diagnosis of shunts A review - Diagnosis of peripheral and aortic diseases - Complications of cardiac catheterization - Contrast induced nephropathy prevention and management.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, ”A Textbook of Electrocardiography”.
2. Nandas”A Text book of Echocardiography”.
3. Grossman W and Baim D, ”A Textbook of cardiac catheterization and interventions”.
4. Bruanwalds,”A Text book of cardiovascular medicine”.

REFERENCES:

1. Davidson, ”A Text book of Medicine”.

CARDIAC EVALUATION AND THERAPIES - II

To learn about optimum use of noninvasive and invasive cardiology techniques.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG and its changes in various conditions and TMT
- Study about echocardiography basics and its techniques
- Learn about invasive techniques in the field of cardiology
- Know about various cardiac procedures
- Know about Care of patient undergoing vascular procedures

UNIT-I Electrocardiography 9

Optimum recording of 12 leads ECG and computerized interpretation - Trouble shooting of ECG artefacts - Bradyarrhythmais and tachyarrhythmia’s - Stress test (tread mill, bicycle and others) -Indications/ contra indications -Complications.

UNIT-II Echocardiography 9

Basics of pediatric echocardiography - Echocardiography in acute rheumatic fever - Echocardiography in chronic rheumatic heart disease - Echocardiography in cardiac tamponade.

UNIT-III Basics of Catheterization and Hemodynamics 9

Preparation for cardiac catheterization - radiation safety and contrast agents - Hardware in catheterization laboratory - right and left heart catheterization - cardiac output and vascular resistance - shunt calculation - hemodynamic monitoring.

UNIT-IV Invasive Procedures 9

Carotid and cerebral angiography - Renal angiography - Studies of abdominal aorta, mesenteric, iliac and others - Myocardial biopsy.

UNIT-V **Care of Patient Undergoing Vascular Procedures** **9**

Indications, contraindications for angiographic studies - Patient education of the invasive procedures, consent processes and preparation - Monitoring physiological variables during cath lab procedures70 - Post procedure protocols - Reporting and data management of the cath procedures.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, "A Textbook of Electrocardiography".
2. Nandas "A Text book of Echocardiography".
3. Grossman W and Baim D, "A Textbook of cardiac catheterization and interventions".

CARDIAC EVALUATION AND THERAPIES - III

To learn about optimum use of noninvasive and invasive cardiology techniques.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG changes, artifacts and calculation of heart rate
- Study about various interventional techniques
- Learn about important medical conditions and their relevance to cardiac care
- Know about various cardiothoracic interventions
- Know about basics of nuclear cardiology

UNIT-I **Electrocardiography** **9**

PR interval - QT interval-Calculation of heart rate - Analysis of ST segment - Artefacts.

UNIT-II **Interventional Techniques** **9**

Percutaneous Balloon Angioplasty and General Coronary Intervention -Atherectomy, Thrombectomy, and Distal Protection Devices - Coronary Stenting - Percutaneous therapies for Valvular Heart Disease - Aortic Endovascular Grafting - Pericardiocentesis- Balloon Pericardiotomy.

UNIT-III **Important Medical Conditions and Their Relevance to Cardiac Care** **9**

Anemia - Renal failure - Bleeding Diathesis - Heart failure - Hypoxia (cyanosis).

UNIT-IV **Cardio Thoracic Interventions** **9**

CPR, defibrillation, pacemaker, cardio version, ventricular assisted devices, IABP.

UNIT-V **Basics of Nuclear Cardiology** **9**

Principles of nuclear cardiology - Tracers used in nuclear cardiology - Imaging techniques in nuclear cardiology - Indications of nuclear diagnostic procedures in cardiology.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, ”A Textbook of Electrocardiography”.
2. Nandas ”A Text book of Echocardiography”.
3. Grossman W and Baim D, ”A Textbook of cardiac catheterization and interventions”.
4. Bruanwalds,”A Text book of cardiovascular medicine”.

REFERENCES:

1. Davidson, ”A Text book of Medicine”.

BIOMEDICAL ENGINEERING DEVICES FOR CARDIAC CARETECHNOLOGY

AIM:

To learn about the basics of principles, practice and applications of various biomedical devices. Setting up, placement, assessment and monitoring, documentation, maintenance and trouble shooting.

OBJECTIVE:

The course will introduce the student to principles, practice, trouble shooting and applications of various biomedical devices.

OUTCOMES:

- The students should learn about basics of biomedical instruments
- Study about echocardiogram procedure and result interpretation
- Learn about patient monitoring system
- Know about pacemaker, TMT and holter monitor
- Know about basics of interventional cardiology

UNIT-I **Basic Biomedical Instruments** **9**

B.P apparatus, stethoscope, ECG machine, physiology of heart, Einthovens triangle, physiology of lungs, cardiovascular system, ECG analysis and interpretation, ECG leads representation, working mechanism of ECG machine, Normal ECG representation. ECG monitoring system, normal ECG values chart, ECG results, ECG reading.

UNIT-II **Patient Monitoring System** **9**

ECG (heart rate), SpO2, NIBP, sinus rhythm/ ABP (invasive and non invasive blood pressure monitoring) Functions of patient monitoring system - Physiological monitor - Working principle - Objective of patient monitoring system - Pressure transducers (AVP/CVP) - Pulse oximeter - Normal range for pulse oximetry -Function of pulse oximeter - Dangerous oxygen level - What happens when blood oxygen levels are too low? Oxygen saturation - Co oximeter - Photo plethysmogram - Arterial blood gas test - Pulse oximeter uses, readings, indications, applications.

UNIT-III **Echocardiography** **9**

Echocardiogram - types - Echo machine - 2D and 3 D echo - Echocardiogram procedure in females - Echocardiogram results interpretation - Defibrillator -define, uses, types, interface with person (history), procedure, training, indication, portable defibrillator, automated external defibrillator.

UNIT-IV **Pacemaker, TMT and Holter Monitor** **9**

Pacemaker- internal pacemaker/ Temporary pacemaker, Artificial cardiac pacemaker, Implantable cardioverter defibrillator, Difference between defibrillator and pacemaker, Signs of reading a pacemaker and life expectancy of a person with a pacemaker - Holter monitoring system-setting up, function and interpretation - TMT machine - Difference between holter monitor and TMT machine.

UNIT-V **Catheterization Laboratory (Cath Lab)** **9**

Cath lab - Procedure, Diagnostic and interventional cardiology, Catheterization standards, Complications, Basics and radiographic images of cath lab - IABP (Intra aortic balloon pump) - purpose, procedure, risks, Components, Working principle, troubleshooting, monitoring - Medical ventilators - Working and its uses in ICU, Anesthesia ventilator, Working principle/ procedure.

TOTAL: 45 HOURS

TEXT BOOK:

1. Leslie Cromwell, ”Biomedical Instrumentation and measurement”, Prentice hall of India, New Delhi.
2. Khandpur R.S, ”Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, NewDelhi.
3. John G. Webster, ”Medical Instrumentation Application and Design”, John Wiley and sons, New York.

REFERENCES:

1. Joseph J.carr and John M. Brown, ”Introduction to Biomedical equipment technology”, John Wiley and sons, New York.

BS26S9 **MEDICAL ETHICS** **2 0 0 2**

AIM:

To provide the code of medical ethics. To provide the details about the medical jurisprudence. To provide the legal frame work for hospitals.

OBJECTIVE:

The course will assist the students in understanding basic laws and ethics related to the field of health care.

OUTCOMES:

- The students should learn about code of medical ethics
- Study about advanced ethical decisions and major laws
- Learn about organizational and procedural laws
- Know about Medical jurisprudence
- Know about Legal framework for hospitals

UNIT-I **Code of Medical Ethics** **9**

Principle of medical ethics, confidentiality, informed consent, decisions of life sustaining therapy, communication, communication barriers, doctor patient relationship, list of offences and professional misconduct of doctors, , bioethics, role of ethics committees, quality assurance programs, medical etiquette.

UNIT-II **Advanced Ethical Decisions and Major Laws** **9**

Advance decisions to refuse treatment, doctor and criminal abortion, ethical issues in stroke management, ethical issues in dementia, quality of life in health care decisions, prenatal diagnostic techniques, regulations and prevention of misuse act 1994 (PNDT act), transplantation of human organs act 1994, medical termination of pregnancy act, labour laws applicable to a hospital, Indian trade union act 1926, industrial dispute act 1947, payment of wages act, employee provident fund act, maternity benefit act.

UNIT-III **Organizational and Procedural Laws** **9**

Indian contract act, nursing home registration act, birth death registration act, regulation of genetic counselling center, regulation of prenatal diagnostic technique, determination of sex prohibited Dying declaration - definition, precautions, procedure of recording, special circumstances Death certificate - precautions while issuing death certificate, contents of death certificate, importance of death certificate.

UNIT-IV **Medical Jurisprudence** **9**

Introduction and legal procedure, medico legal aspects of death injuries, medical ethics, consumer protection act, quality of life in health care decisions, ethical issues in health and social care.

UNIT-V **Legal Framework for Hospitals** **9**

Introduction to legal framework, patients rights and providers responsibility, medical malpractice, medico legal aspects - impotence, sterility, sterilization and artificial insemination; medico legal aspects of psychiatric and mental health, toxicology, laws related to toxicology, organ transplantation act.

TOTAL: 30 HOURS

TEXT BOOK:

1. Parikh C.K, ”Parikhs Textbook of medical jurisprudence and toxicology”., CBS Publications.
2. Jagdish Singh and Bharath Law, ”Medical negligence and compensation”.
3. Gurucharan S. Sai. ”Medical ethics and elderly”, 3rd Edition, Radcliffe publishing Ltd.

PRACTICAL

CARDIAC EVALUATION AND THERAPIES LABORATORY – I

To learn about heart diseases and related disorders. To learn the concepts of cardiovascular - investigations and therapies.

OBJECTIVE:

The course enables the students to understand clinical disorders and drugs related to heart, invasive and noninvasive investigations and cardiac monitoring.

OUTCOMES:

- The students should learn about various cardiac disorders
- Study about drugs related to heart
- Learn about patient monitoring in cardiac care
- Know about various non invasive cardiac investigations
- Know about various invasive cardiac investigations

LIST OF EXPERIMENTS:

1. ECG
2. Pacemaker
3. Defibrillation and cardio version
4. Heart valves
5. Hemodynamic monitoring
6. Ambulatory BP monitoring
7. TMT
8. Pulse oximeter
9. 24 hour holter monitoring
10. Cardiac catheterization

TOTAL: 45 HOURS

CARDIAC EVALUATION AND THERAPIES LABORATORY - II

To learn about optimum use of noninvasive and invasive cardiology techniques.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG and its changes in various conditions and TMT
- Study about echocardiography basics and its techniques
- Learn about invasive techniques in the field of cardiology
- Know about various cardiac procedures
- Know about Care of patient undergoing vascular procedures

LIST OF EXPERIMENTS:

1. ECG changes in bradyarrhythmias and tachyarrhythmias
2. TMT
3. Echo
4. Coronary circulation
5. Diagnostic catheters used for Cardiac catheterization
6. Cerebral angiography
7. Renal angiography
8. Myocardial biopsy

TOTAL: 45 HOURS

CARDIAC EVALUATION AND THERAPIES LABORATORY - III

To learn about optimum use of noninvasive and invasive cardiology techniques.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG changes, artefacts and calculation of heart rate
- Study about various interventional techniques
- Learn about important medical conditions and their relevance to cardiac care
- Know about various cardiothoracic interventions
- Know about basics of nuclear cardiology

LIST OF EXPERIMENTS:

1. ECG
2. Percutaneous balloon angioplasty
3. Thrombectomy
4. Coronary stenting
5. Aortic endovascular grafting
6. Pericardiocentesis
7. Balloon pericardiotomy
8. CPR
9. Pacemaker
10. IABP

TOTAL: 45 HOURS

SEMESTER VI

THEORY

ADVANCED CARDIAC CARE TECHNOLOGY - I

AIM:

To learn about the clinical aspects of cardiac care and implement the knowledge in cardiac care technology.

OBJECTIVE:

The course enables the students to understand various technologies used in the field of cardiology.

OUTCOMES:

- The students should learn about assessment for Cardiac care
- Study about echocardiography and its changes in various disease conditions
- Learn about ambulatory care techniques
- Know about various invasive technologies
- Know about IABP, fractional flow reserve and intravascular ultrasound

UNIT-I **Assessment for Cardiac Care** **9**

Non-Invasive technology - ECG,ECHO, TMT- Invasive technology - Angiography - Interventional procedures.

UNIT-II **Electrocardiography A Review** **9**

Chamber hypertrophy - Acute coronary syndromes - Brady arrhythmias - Tachyarrhythmais -Pericardial diseases.

UNIT-III **Ambulatory Cardiac Technologies** **9**

Holter monitoring - Loop recorders, Ambulatory blood pressure recording, Newer technologies for monitoring the patients with heart diseases.

UNIT-IV **Cardiac Invasive Procedures** **9**

Coronary angiogram for performing angioplasty - PTCA, Coronary Stents, Optimizing the results of PTCA.

UNIT-V **Invasive Technologies** **9**

Intra-aortic balloon pump - Fractional flow reserve - Rotational atherectomy- Intra vascular ultrasound - Optical coherence tomography.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, ”A Textbook of Electrocardiography”.
2. Nandas”A Text book of Echocardiography”.
3. Grossman W and Baim D, ”A Textbook of cardiac catheterization and interventions”.
4. Bruanwalds,”A Text book of cardiovascular medicine”.

REFERENCES:

1. Davidson, ”A Text book of Medicine”.

ADVANCED CARDIAC CARE TECHNOLOGY -II

AIM:

To learn about the clinical aspects of cardiac care and implement the knowledge in cardiac care technology.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG changes
- Study about echocardiography and its changes in various disease conditions
- Learn about common drugs used in cardiac patients
- Know about various invasive techniques
- Know about various conditions in cardiology

UNIT-I **Electrocardiography** **9**

Diagnoses of acute myocardial infarction -Diagnoses of hyperkalemia - Diagnoses of WPW syndrome - Diagnoses of arrhythmias.

UNIT-II **Echocardiography** **9**

Congenital heart diseases - ASD, VSD, PDA, Coarctation of aorta, Pulmonary and aortic stenosis, Tetralogy of Fallout, Others - Trans esophageal echocardiography - Stress echocardiography - (pharmacological) - 3D echocardiography.

UNIT-III **Cardiac Common Drugs used in Dardiac Patients** **9**

Antiplatelets drugs - Antiischaemic drugs - Thrombolytic drugs - Antiarrhythmic drugs - Atropine - Digoxin - Nitrates.

UNIT-IV **Invasive** **9**

Organization of cath lab services - Data management of cath lab78 - Management of intra coronary thrombus - Management of hypotension - Management of vasovagal attack - Management of coronary perforation - Management of retrieval of dislodged foreign materials in the vessels.

UNIT-V **Disorders in Cardiology** **9**

Myocardial infarction with complications - Valvular heart diseases - Pulmonary thrombo embolism - Infective endocarditis - Cardiomyopathies - Rheumatic heart diseases.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, ”A Textbook of Electrocardiography”.
2. Nandas ”A Text book of Echocardiography”.
3. Grossman W and Baim D, ”A Textbook of cardiac catheterization and interventions”.
4. Bruanwalds,”A Text book of cardiovascular medicine”.

REFERENCES:

1. Davidson, ”A Text book of Medicine”.

APPLIED CORONARY ANGIOGRAPHY AND ECHOCARDIOGRAPHY

AIM:

To learn about the basics of coronary angiography.

OBJECTIVE:

The courses enhance students learning in hemodynamics, various angiogram and echo techniques and diagnosis.

OUTCOMES:

- The students should learn about basics of cardiac catheterization
- Study about different approaches used in cardiac catheterisation
- Learn about hemodynamic principles and angiographic techniques
- Know about special catheter techniques
- Know about diagnostics and various techniques in Echo
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UNIT-I Basics of Cardiac Catheterization 9

Cardiac Catheterization History and Current Practice Standards - Cineangiographic Imaging - Radiation - Safety, and Contrast Agents - Integrated Imaging Modalities in the Cardiac Catheterization Laboratory - Complications - Adjunctive Pharmacology for Cardiac Catheterization.

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UNIT-II Basic Techniques 9

Percutaneous Approach including Transseptal and Apical Puncture - Radial Artery Approach - Cut down Approach: Brachial, Femoral, Axillary, Aortic and Trans apical - Diagnostic Catheterization in Childhood and Adult Congenital Heart Disease.

UNIT-III Hemodynamic Principles and Angiographic Techniques 9

Hemodynamic principles - Pressure Measurement , Blood Flow Measurement: Cardiac Output and Vascular Resistance, Shunt Detection and Quantification , Calculation of Stenotic Valve Orifice Area, Pitfalls in the Evaluation of Hemodynamic Data - Angiographic techniques - Coronary Angiography, Coronary Artery Anomalies, Cardiac Ventriculography, Pulmonary Angiography, Angiography of the Aorta and Peripheral Arteries.

UNIT-IV **Special Catheter Techniques** **9**

Evaluation of Myocardial and Coronary Blood Flow and Metabolism - Intravascular imaging Techniques - Endomyocardial Biopsy - Percutaneous Circulatory Support: Intra-aortic Balloon Counter pulsation and Extracorporeal Bypass.

UNIT-V **Diagnostics and Various Techniques in Echo** **9**

Trans esophageal and stress echo and other echo techniques - trans esophageal echo, stress echo, contrast echo, three-dimensional (3-D) echo - Cardiac masses, infection and congenital abnormalities - Cardiac masses, infection, artificial (prosthetic) valves, congenital abnormalities

- Special situations and conditions- Hypertension and LVH, screening and follow-up echo.

L: 45 + T: 15 = TOTAL: 60 HOURS

TEXT BOOK:

1. Goldberger, "A Textbook of Electrocardiography".
2. Nandas"A Text book of Echocardiography".
3. Grossman W and Baim D, "A Textbook of cardiac catheterization and interventions".
4. Bruanwalds,"A Text book of cardiovascular medicine".

REFERENCES:

1. Davidson, "A Text book of Medicine".

BASIC INTENSIVE CARE

AIM:

To learn about basic intensive care concepts by applying the knowledge of patient care, anatomy, physiology and medical disorders.

OBJECTIVE:

The course enables the students to understand general ICU care and monitoring and infection control measure in ICU.

OUTCOMES:

- The students should learn about general ICU care and monitoring
- Study about Infection Control and Nutrition in ICU
- Learn about Systemic Diseases and Care in ICU
- Know about Head Injury and Trauma care in ICU
- Know about Acid base disorders, neonatal ventilation and imaging in ICU

UNIT-I **General ICU Care and Monitoring** **9**

General care and transport of ICU patient - eye, skin, bladder care, position, airways, drains, catheters. Transport of critically ill patient to and out of ICU, transport of patient with drains, airway, inotropes, mechanical ventilator - Monitoring in critical care: vital signs, drains, ECG, fluid intake & output, invasive hemodynamic and central venous pressure monitoring.

UNIT-II **Infection Control and Nutrition in ICU** **9**

Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy - Nutrition and Fluid balance - total parentral nutrition, nasogastric tube, gastric tube, jejunostomy tube care and feeding, IV Fluids.

UNIT-III **Systemic Diseases and Care in ICU** **9**

Cardiac care in ICU: hypertension, hypotension, arrhythmias, cardiac arrest, ACLS - Respiratory care in ICU: airway care, tracheostomy care, endotracheal intubation, mechanical ventilation, care of ventilated patient, complications and weaning -Renal failure: types, etiology, complications, corrective measures - Hepatic failure: types, etiology, complications, corrective measures.

UNIT-IV **Head Injury and Trauma Care in ICU** **9**

Head injury and Trauma Care: Glasgow coma scale, care of head injury patient, poly trauma patient - Blood and blood products transfusion: Transfusion reactions & complications, Massive transfusion.

UNIT-V **Acid Base Disorders, Neonatal Ventilation, Imaging in ICU** **9**

Acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management - Neonatal mechanical ventilation: intubation and problems inherent to the neonate, basic principles of neonatal ventilation, modes, initiation and maintenance - Miscellaneous: X-rays, ultrasound, chest and limb physical therapy in ICU.

TOTAL: 45 HOURS

TEXT BOOK:

1. Mary Lou Sole, ” Introduction to Critical care Nursing”.
2. Janice one, ” Critical care Notes: Clinical Pocket guide”.

REFERENCES:

1. PaulL.Marino,”The ICU book”.
2. Jean Louis Vincent, ”Text book of Critical care: Expert consult”.
3. AACN Essentials of Critical care Nursing - American Association of Critical care Nursing.

HOSPITAL MANAGEMENT

AIM:

To learn about the basics of coronary angiography.

OBJECTIVE:

The courses enhance students learning in hemodynamics, various angiogram and echo techniques and diagnosis.

OUTCOMES:

- The students should learn about quality management
- Study about hospital information system
- Learn about inventory control
- Know about occupational health and safety measures
- Know about biomedical waste management methods

UNIT-I **Quality Management** **9**

Quality Concepts: Definition of Quality, Dimensions of Quality, Basic concepts of Total Quality Management, Quality Awards - Accreditations for hospitals: Understanding the process of getting started on the road to accreditation, National and International Accreditation bodies, overview of standards- ISO (9000 & 14000 environmental standards), NABH, NABL, JCI, JACHO.

UNIT-II **Hospital Information System** **9**

Hospital Information System: Hospital Information System Management and software applications in registration, billing, investigations, reporting, ward management and bed distribution, medical records management, materials management and inventory control, pharmacy management, dietary services, management, information processing. Security and ethical challenges.

UNIT-III **Inventory Control** **9**

Inventory Control: Concept, various costs of inventory, Inventory techniques-ABC, SDE / VED Analysis, EOQ models - Storage: Importance and functions of storage - Location and layout of stores - Management of receipts and issue of materials from stores, Warehousing costs, Stock verification.

UNIT-IV **Occupational Health and Safety** **9**

Occupational health, occupational safety, aims and objectives, common occupational hazards in hospitals, occupational hazards in emergency unit, general methods of prevention of occupational diseases, personal protective equipments, role of health care professionals in prevention of occupational hazards or diseases.

UNIT-V **Biomedical Waste Management** **9**

Biomedical Waste Management: Meaning, Categories of Biomedical Wastes, Colour code practices, Segregation, Treatment of biomedical waste - Incineration and its importance - Standards for waste autoclaving, Microwaving - Packaging, Transportation & Disposal of Biomedical wastes.

TOTAL: 30 HOURS

TEXT BOOK:

1. Goel S L & Kumar R. 2004. Hospital Core Services: Hospital Administration of the 21st Century. Deep Deep Publications Pvt Ltd: New Delhi
2. Gupta S & Kant S. 1998. Hospital & Health Care Administration: Appraisal and Referral Treatise. Jaypee: New Delhi

3. Harris M G & Assoc. 2003. Managing Health Service: Concepts & Practices. Maclennan + Petty: Sydney

4. Kelly D L. 2006. Encyclopaedia of Quality Management in Hospitals & Health Care Administration. Vol 1-6. Pentagon Press: Chicago

REFERENCES:

1. Kilpatrick A O & Johnson J A. 1999. Handbook of Health Administration & Policy. Marcel DekkesInc: New York

2. Kumar A. 2000. Encyclopaedia of Hospital Administration & Development: Volume I. Anmol Publications Ltd: New Delhi.

3. Ransom S B. Joshi M S & Nash D B. 2006. The Health Care Quality Book: Vision, Strategy & Tools. Standard Publishers Distributors: Delhi

4. Reddy N K S. 2000. Medical Jurisprudence & Toxicology. ALT Publications: Hyderabad

PRACTICAL

ADVANCED CARDIAC CARE TECHNOLOGY LAB - I

AIM:

To learn about the clinical aspects of cardiac care and implement the knowledge in cardiac care technology.

OBJECTIVE:

The course enables the students to understand various technologies used in the field of cardiology.

OUTCOMES:

- The students should learn about assessment for Cardiac care
- Study about echocardiography and its changes in various disease conditions
- Learn about ambulatory care techniques
- Know about various invasive technologies
- Know about IABP, fractional flow reserve and intravascular ultrasound

LIST OF EXPERIMENTS:

1. Angiography
2. ECG changes in Brady arrhythmias and tachyarrhythmia's
3. Ambulatory BP monitoring
4. Holter monitoring
5. PTCA
6. Coronary stents
7. Intra aortic balloon pump
8. Intravascular ultrasound

TOTAL: 45 HOURS

ADVANCED CARDIAC CARE TECHNOLOGY LAB - II

AIM:

To learn about the clinical aspects of cardiac care and implement the knowledge in cardiac care technology.

OBJECTIVE:

The course enables the students to understand about optimum use of noninvasive and invasive cardiology techniques such as ECG, Stress test, Echocardiography, cardiac catheterization etc.

OUTCOMES:

- The students should learn about ECG changes
- Study about echocardiography and its changes in various disease conditions
- Learn about common drugs used in cardiac patients
- Know about various invasive techniques
- Know about various conditions in cardiology

LIST OF EXPERIMENTS:

1. ECG changes in Myocardial infarction, hyperkalemia, WPW syndrome, arrhythmias
2. Trans esophageal echocardiography
3. Stress echocardiography
4. 3D echocardiography
5. Antiplatelet
6. Antiarrhythmic drugs
7. Thrombolytic drugs
8. Myocardial biopsy
9. Artificial Heart valves
10. Coronary artery bypass graft

TOTAL: 45 HOURS

APPLIED CORONARY ANGIOGRAPHY AND ECHOCARDIOGRAPHY LABORATORY

AIM:

To learn about the basics of coronary angiography.

OBJECTIVE:

The courses enhance students learning in hemodynamics, various angiogram and echo techniques and diagnosis.

OUTCOMES:

- The students should learn about basics of cardiac catheterization
- Study about different approaches used in cardiac catheterization
- Learn about hemodynamic principles and angiographic techniques
- Know about special catheter techniques
- Know about diagnostics and various techniques in Echo

LIST OF EXPERIMENTS:

1. Cardiac catheterization
2. PTCA
3. Cardiac output measurement
4. Shunt calculation
5. Coronary angiography
6. Cardiac ventriculography
7. Pulmonary angiography
8. Endomyocardial biopsy
9. Intra-aortic balloon counter pulsation
10. Extracorporeal bypass

TOTAL: 45 HOURS