



VELS



INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)
(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)
PALLAVARAM - CHENNAI

ACCREDITED BY **NAAC** WITH '**A**' GRADE
Marching Beyond 30 Years Successfully
INSTITUTION WITH **UGC 12B** STATUS

Department of Operation Theatre & Anesthesia Technology

Minutes of 1st BOS Meeting

Venue

Vel Nursing College,
Velan Nagar,
Manjankaranai, Thiruvallur Dt

Date & Time

22.09.2022 & 11.00 am

MINUTES OF BOARD OF STUDIES

The Board of Studies meeting for the Programme B.Sc Operation Theatre and Anesthesia Technology, School of Allied Health Sciences, VISTAS was held on **22.09.2022** at 11 a.m in Vel Nursing College, Velan Nagar to discuss the **implementation of UG Program Curriculum & Syllabi of B.Sc. Operation Theatre & Anesthesia Technology for the regulation 2022** which to be followed from the academic year 2022-2023.

The following members were present for the BoS meeting

S. No	Name of the Board Member	Designation	Institute / Industry	Role
Internal Members				
1	Mrs.Hemamalini J	Professor and Principal	Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai	Chairperson
2	Mrs.Ramya G M	Vice Principal	Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai	Chairperson
3	Mrs.Jebaseeli V	Assistant Coordinator	Vels Institute of Science, Technology & Advanced Studies (VISTAS), Chennai	Member
External Expert Members				
1	Mr.S.Thulasi Dass., M.Sc.,(MIT), Ph.D. (Pursuing)	AssistantProfessor	Sri Ramachandra Institute of Higher Education& Research, Porur,Chennai-116	Member
2	Mr.K.J. Vijay M.Sc.,Neuro Science Technology	AssistantProfessor	Sri Ramachandra Institute of Higher Education& Research, Porur,Chennai-116	Member
3	Ms.A.Hemalatha M.Sc.Renal Sciences and Dialysis Technology, Ph.D (Pursuing)	Senior Lecturer	Sri Ramachandra Institute of Higher Education & Research, Porur, Chennai-116	Member
Student Member				
1.	Ms.Sakthipriya.S	I Year	Vel Institute of Science, Technology& Advanced Studies, School Of Allied Health Sciences, Velan Nagar, Manjankaranai Village ,Periyapalayam Road,Uthukottai TK,ThiruvallurDistrict -601102	Member

AGENDA OF THE MEETING

Item No.	Particulars
BoS / 2022 / OTAT / UG / 1.1	Objective of the Implementation for new syllabus shown in Annexure I.
BoS / 2022 / OTAT / UG / 1.2	Feedback from Stakeholders to ensure that the syllabus of the courses include the state-of-the-art technologies focusing on skill development, employability, and entrepreneurship
BoS / 2022/ OTAT / UG / 1.3	Implementation of New courses
BoS / 2022/ OTAT / UG / 1.4	

MINUTES OF THE MEETING

Mrs.J.Hemamalini, Professor and Principal, Chairman, BOS initiated the meeting with a warm welcome and introduced the external members, the internal and co-opted members, and thanked them for accepting the invitation to the 1st BoS meeting.

BoS / 2021 / MECH / UG / 1.1

Objective of the Implementation for new syllabus

- To develop the curriculum and syllabi based on the guidelines of AICTE and the principles of Outcome Based Education (OBE)/Learning Outcome Based Curriculum Framework (LOCF).
- To implement the guidelines and suggestions of the new education policy.
- To consider the Competencies and Performance Indicators of the B.Sc.Operation Theatre & Anesthesia Technology programme defined as per the recommendations of the National Model Curriculum.
- To enhance the Course Outcomes (CO) of all the courses by focusing on skill development, employability, and entrepreneurship.
- To consider the mapping of CO to the Program Outcomes (PO) and Programme Specific Outcomes (PSO) of all the courses using the defined Competencies and Performance Indicators.

Minutes are Reviewed and Confirmed

BoS / 2022 / OTAT / UG / 1.2

Feedback from Stakeholders to ensure that the syllabus of the courses include the state-of-the-art technologies focusing on skill development, employability, and entrepreneurship

External Members : The curriculum is well structured and the syllabus has been updated to improve the hands on knowledge. Clinical training can be improved and more credits can be given for Internship and Projects. The curriculum of B.Sc.Operation Theatre & Anesthesia Technology , should consider more hands on courses, in partnership with Hospitals.

Academic Experts: Syllabus is updated with courses that include the recent technological advancements. Blended learning, Internship, MOOCs and Project based courses can improve the hands on knowledge and exposure of the students. Clinical based projects and mini projects can to improve the quality of students work and give them better exposure.

The Competencies and Performance Indicators (PI) are well defined for both the programmes. The CO-PO mapping is based on Knowledge Levels and is well justified.

Minutes are Reviewed and Confirmed

BoS / 2022 / MECH / UG / 3.4

Implementation of New courses

S. No	New Courses
	Regulation 2022
1.	General Anatomy
2.	General Physiology
3.	General Biochemistry
4.	Medical Law & Ethics
5.	English & Communication Skills
6.	General Pathology
7.	General Microbiology
8.	General Pharmacology
9.	Medical Terminology & Record Keeping
10.	Basics of Computer
11.	Principles of Anesthesia-I
12.	Clinical Pharmacology
13.	Medicine
14.	Psychology
15.	Laboratory Technoques
16.	Principles of Anesthesia-II
17.	Clinical Microbiology
18.	CSSD Including Sterlisation
19.	Ethical & Legal Issues
20.	Patient Monitoring
21.	Anesthesia for Specialities-I
22.	Principles of Sterlisation Techniques
23.	Airway Care & Oxygen Therapy
24.	Anesthesia for Specialities-I
25.	Anesthesia for Trauma & Emergency
26.	Health & Basic Principles
27.	Stastics & Research Methodology

- Resolved that the Curriculum & Syllabus for the B.E – Mechanical Engineering programme (Regulation 2022), designed as per the Learning outcome-based curriculum framework (LOCF) guidelines of UGC and Model Curriculum of AICTE, effective from the Academic Year 2022-2023 be approved.
- Resolved that the Curriculum & Syllabus for the first year B.E. Mechanical Engineering programme (Regulation 2022), designed as per the Learning outcome-based curriculum framework (LOCF) guidelines of UGC and Model Curriculum of AICTE, effective from the Academic Year 2022-2023 be approved.

Minutes are Reviewed and Confirmed

The Board of Studies resolved to approve the above suggestions for B.Sc.Operation Theatre & Anesthesia Technology brought forward by the Chairman to implementing the new courses . The meeting was concluded at 11.00 AM with a vote of thanks by **Mrs.Hemamalini, Principal, School of Allied Health Sciences.**

Signature of the Members:

S. No	Name of the Board Member	Designation	Signature
Internal Members			
1	Mrs.Hemamalini J	Professor and Principal	
2	Mrs.Ramya G M	Vice Principal	
3	Mrs.Jebaseeli V	Assistant Coordinator	
External Expert Members			
1.	Mr.S.Thulasi Dass., M.Sc.,(MIT), Ph.D. (Pursuing)	AssistantProfessor	
2.	Mr.K.J. Vijay M.Sc.,Neuro Science Technology	AssistantProfessor	
	Ms.A.Hemalatha M.Sc.Renal Sciences and DialysisTechnology, Ph.D (Pursuing)	Senior Lecturer	
Student Members			
1.	Ms.Sakthipriya	I Year	

ANNEXURE I

Curriculum

B.SC.OPERATION THEATRE AND ANESTHESIA TECHNOLOGY

Category	Code	Course	Year of Introduction	Interdisciplinary	Activities/Content with direct on Employability / Competency/ Entrepreneurship / Skill development
	22OTPT001	General Anatomy	2022-2023	Interdisciplinary	
	22OTPT002	General Physiology	2022-2023	Interdisciplinary	
	22OTPT003	General Biochemistry	2022-2023	Interdisciplinary	
	22OTPT004	Medical Law & Ethics	2022-2023	Interdisciplinary	
	22OTPT005	English & Communication Skills	2022-2023	Interdisciplinary	Skill development

SEMESTER II

Category	Code	Course	Year of Introduction	Activities/Content with direct on Interdisciplinary	Activities/Content with direct on Employability/ Competency/ Entrepreneurship / Skill development
	22OTPT006	General Pathology	2022-2023	Interdisciplinary	
	22OTPT007	General Microbiology	2022-2023	Interdisciplinary	
	22OTPT008	General Pharmacology	2022-2023	Interdisciplinary	
	22OTPT009	Medical Terminology & Record Keeping	2022-2023		Employability
	22OTPT010	Basics of Computer	2022-2023	Interdisciplinary	Skill development

SEMESTER III

Category	Code	Course	Year of Introduction	Activities/Content with direct on Interdisciplinary	Activities/Content with direct on Employability/ Competency/ Entrepreneurship / Skill development /
	22OTPT011	Principles of Anesthesia-I	2022-2023		Employability
	22OTPT012	Clinical Pharmacology	2022-2023	Interdisciplinary	
	22OTPT013	Medicine	2022-2023		Employability
	22OTPT014	Psychology	2022-2023	Interdisciplinary	
	22OTPT015	Laboratory Technology	2022-2023		Employability

SEMESTER IV

Category	Code	Course	Year of Introduction	Activities/Content with direct on Interdisciplinary	Activities/Content with direct on Employability/ Competency/
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					Entrepreneurship / Skill development /
	22OTPT016	Principles of Anaesthesia – II Theory	2022-2023		Employability
	22OTPT017	Clinical Microbiology Theory	2022-2023	Interdisciplinary	
	22OTPT018	CSSD including Sterilization Theory	2022-2023		Skill Development
	22OTPT019	Ethical and Legal Issues	2022-2023		
	22OTPT020	Patient Monitoring*	2022-2023		

SEMESTER V

Category	Code	Course	Year of Introduction	Activities/Content with direct on Interdisciplinary	Activities/Content with direct on Employability/ Competency/ Entrepreneurship / Skill development /
	22OTPT021	Anaesthesia for Specialties – I Theory	2022-2023		Employability
	22OTPT022	Principles Of Sterilization Techniques Theory	2022-2023		Employability
	22OTPT023	Airway Care and Oxygen Therapy	2022-2023		Employability
	22OTPT024	Basics of Biomedical Engineering	2022-2023		Employability

SEMESTER VIII

Category	Code	Course	Year of Introduction	Activities/Content with direct on Interdisciplinary	Activities/Content with direct on Employability/ Competency/ Entrepreneurship / Skill development /
	22OTPT025	Anaesthesia for specialties – II	2018-19	-	Employability
	22OTPT026	Anaesthesia for Trauma and Emergency Theory	2018-19	-	Employability
	22OTPT027	Health and Basic Principles	2018-19	-	Entrepreneurship
	22OTPT028	Statistics and Research Methodology	2018-19	Interdisciplinary	Entrepreneurship



FIRST SEMESTER

		L	T	P	Credits
	General Anatomy	3	1	2	6

Course objectives:

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

Unit I: Organization of the Human Body

Introduction to the human body - Definition and subdivisions of anatomy- Anatomical position and terminology Regions and Systems of the body -Cavities of the body and their contents - Levels of organization of the body. Cell – Definition of a cell, shapes and sizes of cells - Parts of a cell – cell membranes cytoplasm, subcellular organelles and their main functions. Cell Division – Definition and main events that occur in different stages of mitosis and meiosis. Tissues – Tissues of the body - Definition and types of basic tissues - Characteristics, functions and locations of different types of tissues.

Unit II: Systems of Support and Movement

1. Skeletal system

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

2. Muscular system

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

Unit III: Control Systems of the Body

1. Nervous system

Sub-divisions of the nervous system , Spinal cord – Location, extent, spinal segments, external features and internal structure. Brain – Sub- divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum.

Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord. Cranial nerves - Name, number, location and general distribution. Spinal nerves - Typical spinal nerve groups and number of spinal nerves. Name and location of cervical plexus and brachial plexus. Location and general distribution of the branches. Autonomic Nervous system – definition and functions.

2. **Sense organs** Location and features of the nose, tongue, eye, ear and skin
3. **Endocrine system** Names of the endocrine glands. Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes. Names of hormones produced by each gland.

Unit IV: Maintenance of the Human Body

1. **Cardio-vascular system:** Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall, conducting system of the heart. Blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of principal arteries and veins.
2. **Lymphatic system** Lymph, lymphatic vessels, name, location and features of the lymphatic organs.
3. **Respiratory system:** Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

Unit V: Excretion of the Human Body

1. **Digestive system:** Names of organs of digestion. Parts of alimentary canal and accessory organs. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder.
2. **Urinary system:** Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra

Unit VI: Reproduction Function of the Human Body

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

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

Practicals and Demonstrations:

1. Identification of the parts of the microscope.
2. Identification of the epithelium in a given histological slide.
3. Demonstrate the parts of the long bone.
4. Identification of the bones and joint of the body with the articular surfaces (skeleton or X-rays)
5. Identification of the important muscles in upper limb, lower limb and head and neck.
6. Identification of the parts of the brain (cerebrum, cerebellum, brainstem, spinal cord)
7. Identification of the cardiac chambers in a specimen.
8. Identification of the major vessels of heart – aorta and pulmonary trunk.
9. Identification of the cardiac field in chest X-ray.
10. Identification of the nasal cavity, naso pharynx, trachea, lung and pleura in a given specimen.
11. Identification of the lung shadow, costophrenic angle in a chest X-ray.
12. Identification of the stomach, pancreas, liver, small intestine and large intestine specimens.
13. Identification of the stomach, intestinal shadows in plain or contrast abdomen X – ray.
14. Identification of the kidney, Ureter and urinary bladder in specimen.
15. Identification of the renal pelvis, Ureter and urinary bladder in intravenous pyelogram
16. Identification of the thyroid gland in cadaveric specimen

Recommended books:

1. MARIANO S.H. DIFIORE: Atlas of Human Histology, 5th Ed. 1981, Lea and Feliger
2. B.D. CHAURASIA: Handbook of General Anatomy, 2nd Ed., CBS Publishers and Distributors, New Delhi - 110 032.

Course Outcome

CO1:	Apply concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology related to all the systems	
CO2:	Communicate information related to these systems through written, verbal, or multimedia formats in order to assess current knowledge, answer investigative questions, and explore new questions for additional research.	
CO3:	Evaluate information on human health and medical research as to its social, environmental, and ethical implications as part of responsible citizenship.	

C04:	Use scientific laboratory equipment in order to gather and analyze data on human anatomy and physiology.	
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Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓	✓			✓	✓	
C02	✓		✓				✓	
C03	✓	✓	✓			✓		
C04	✓		✓			✓	✓	
AVERAGE								

Assessment Methods

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	General Physiology	3	1	2	6

Course Objectives:

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

UNIT I: GENERAL PHYSIOLOGY

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

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

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

UNIT II: DIGESTIVE SYSTEM, SKIN & EXCRETORY SYSTEM

Salivary glands- Nerve supply, functions of saliva, Gastric juice- composition & functions of gastric juice. Pancreatic juice – composition, functions and regulation of Pancreatic juice, Bile – composition, functions of bile & bile salts. Succus entericus and small intestinal movements, Deglutition, vomiting, functions of large intestine

Structure of sweat glands; temperature regulation

Structure of Nephron and its blood supply, Juxta Glomerular Apparatus (JGA) Formation of urine- Filtration, Reabsorption & Secretion, Counter-Current mechanism, Micturition.

UNIT III: ENDOCRINE SYSTEM & REPRODUCTION

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

Male reproductive organs - Spermatogenesis and Testosterone actions, Female reproductive organs - Menstrual cycle

UNIT IV: RESPIRATORY SYSTEM

Structure of upper and lower respiratory tract. Muscles of respiration and Mechanism of respiration. Lung volumes and capacities – definitions, normal values, intra pulmonary and intra pleural pressures, surfactant Oxygen transport, Carbon-dioxide transport - Neural and chemical regulation of respiration - Hypoxia, cyanosis

UNIT V: CARDIOVASCULAR SYSTEM

Cardiac muscle, action potential & conducting system of the heart, Cardiac cycle, ECG, heart sounds Cardiac output-Definition, factors regulating cardiac output and measurement of cardiac output. Blood pressure – Definition, measurement, factors maintaining B.P, Regulation of B.P, Regional circulation – Coronary and Cerebral

UNIT VI: NERVOUS SYSTEM & SPECIAL SENSES

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

Practical:

1. Recording of Arterial Blood Pressure (BP)

Practical Demonstration:

1. Determination of RBC count
2. Determination of WBC count
3. Differential leucocyte count (DLC)
4. Determination of Hb, PCV & ESR.
5. Determination of Blood groups, Bleeding and clotting time.
6. Charts & Instruments – Spotters

Recommended Book

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

COURSE OUTCOME

C01:	Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.	
C02:	Explain the interplay between different organ systems and how organs and cells interact to maintain biological equilibria in the face of a variable and changing environment.	
C03:	Use complex electronic equipment including Power labs and Bioamplifiers to record human physiological data, and responses to experimental stimuli.	
C04:	Interpret and draw inferences from experimental measures of physiological function including electrocardiograms and spirometry read-outs	
C05:	Apply experimental design skills to understand population responses and interpreting quantitative data	
C06:	Explain physiological processes accurately and concisely in journal-style format and orally, using relevant scientific terminology and nomenclature.	

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Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓	✓			✓	✓	
C02	✓	✓				✓	✓	
C03	✓		✓			✓	✓	
C04			✓			✓	✓	
C05	✓	✓	✓			✓	✓	
C06	✓							
AVERAGE								

Assessment Methods

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	General Biochemistry	3	1	2	6

Course Objectives:

To have a knowledge about the chemistry and metabolism of various macromolecules- carbohydrate, protein and lipids

- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Haemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

Unit – I: Carbohydrates

Classification of carbohydrates and their biological importance, reducing property of sugars.

Metabolism of Carbohydrates : Digestion and Absorption of carbohydrates, steps of Glycolysis and energetics, steps of TCA cycle and energetics, steps of Glycogen synthesis and breakdown, significance of HMP shunt pathway, definition and steps of Gluconeogenesis, Galactose metabolism, Diabetes mellitus, Galactosemia.

Bioenergetics: Importance of ATP, outline of respiratory chain

Unit – II: Lipids

Classification of lipids, essential fatty acids, functions of cholesterol, triglycerides, and phospholipids

Metabolism of Lipids : Digestion and Absorption of lipids, steps of β oxidation of fatty acids, types and functions of lipoprotein, Lipid profile, hypercholesterolemia

Haemoglobin: Structure and functions of Haemoglobin.

Unit – III: Proteins

–Classification of amino acids, structure of proteins, plasma proteins, immunoglobulins.

Metabolism of Proteins: Digestion and absorption of proteins, transamination, deamination, steps of urea cycle, Phenylketonuria, Alkaptonuria, Transmethylation, products derived from Glycine and tyrosine

Nucleic acids: Structure and function of DNA & RNA, Types of RNA

Unit – IV: Enzymes

Definition, classification, coenzymes, factors affecting enzyme activity, Types and examples of enzyme inhibition.

Function Tests: Liver function tests, Renal function tests

Vitamins : Classification, Fat soluble vitamins: Functions, source, deficiency manifestations of vitamin A, D E and K, Functions and deficiency manifestations of vitamin C, co-enzymic forms and deficiency manifestations of B-complex vitamins.

Unit – V: Nutrition & Minerals

Basal metabolic rate (BMR), Specific Dynamic Action (SDA), Glycemic index, Dietary fiber, Balanced diet, Protein Energy Malnutrition (PEM).

Calcium, Phosphorus, Iron, iodine. Outline of PH homeostasis

BIOCHEMISTRY SYLLABUS FOR PRACTICALS

QUALITATIVE TESTS OF MONOSACCHARIDES (GLUCOSE AND FRUCTOSE)

1. Molisch's test
2. Fehling's test
3. Benedict's test
4. Seliwanoff's test

QUALITATIVE TESTS OF LIPIDS

1. Solubility tests
2. Emulsification tests
3. Saponification tests

QUALITATIVE TESTS OF PROTEINS

1. Isoelectric precipitation tests
2. Heat coagulation tests

Text books Recommended:

1. Textbook of Biochemistry for Paramedical Students by Dr.P.Ramamoorthy
2. Essentials of Biochemistry by U. Sathyanarayana

COURSE OUTCOME

CO1:	Undertake investigations and perform analyses that provide information about biochemical questions and help to solve biochemical problems..	
CO2:	Demonstrate accurate quantitative analysis and computer literacy.	
CO3:	Communicate effectively, through writing and oral communication, the results of scientific investigations.	
CO4:	Understand and effectively apply scientific ethics.	

C05:	Evaluate scientific arguments critically.	
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Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓				✓	✓	
C02			✓			✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓	✓	✓				✓	
C05	✓	✓				✓		
AVERAGE								

Assessment Methods

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

	Medical Law & Ethics	L	T	P	Credits
		2			2

Course Objectives

1. To develop sound understanding among both medical students and law students about the latest developments in this field.
2. To render service to humanity with full respect for dignity of human beings.

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical

Problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal- Scope , Introduction to Code of conduct
2. Basic principles of medical ethics
3. Confidentiality
4. Malpractice and negligence
5. Rational and irrational drug therapy
6. Autonomy and informed consent
7. Right of patients
8. Care of the terminally ill and Euthanasia
9. Organ transplantation

10. Sentinel events

RECOMMENDED BOOKS:

Medical ethics by C.M.Francis

Course Outcome

C01:	The student will be able to accurately define, identify, or describe legal, ethical, and moral boundaries pertaining to the provision of healthcare services.	
C02:	The student will be able to define, identify, and describe criminal and civil law as it applies to the provision of healthcare services	
C03:	The student will understand what constitutes malpractice and negligence, including how to minimize the risk and mitigate the consequences of each.	
C04:	The student will understand the legal requirements associated with the collecting, protecting, and retaining of patient medical information.	
C05:	Students will learn and demonstrate the analytical skills required to identify and apply relevant law and ethics to actual case scenarios.	

Mapping of Program Outcomes with course outcomes

C0	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓				✓		
C02	✓		✓			✓	✓	
C03	✓		✓			✓	✓	
C04	✓						✓	
C05	✓	✓						
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

		L	T	P	Credits
	Communication and soft skills	2			2

Course Objective

- To acquire ability to speak effectively in real life situations.
- To write letters and reports effectively in formal and business situations.
- To develop listening skills for academic and professional purposes.
- To gain effective speaking and listening skills in communication.
- To develop the soft skills and interpersonal skills to excel in their career.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment procedures.

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

Course Outcome

C01:	Improve the language proficiency of a technical under-graduate in English with emphasis on Learn, Speak, Read and Write skills.	
C02:	Develop listening skills for academic and professional purposes .	
C03:	Acquire the ability to speak effectively in English in real life situations.	
C04:	learning environment to practice listening, speaking, reading and writing skills.	
C05:	Variety of self-instructional modes of language learning and develop learner autonomy.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01		✓	✓				✓	
C02	✓	✓	✓				✓	✓
C03	✓	✓	✓				✓	
C04	✓		✓					✓
C05			✓					✓

AVERAG E								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

SECOND SEMESTER

		L	T	P	Credits
	Pathology	3	1	2	6

Course objectives:

1. Describe the features of inflammation and cellular adaptation, cell injury
2. Identify and describe the features of haemodynamic disorders and deficiency diseases
3. Understand and describe the pathogenesis and pathology of various systemic disorders

Unit I: Introduction

Concept of diseases, classification of lesions - Inflammation and repair
- Cellular adaptation, Cell injury, necrosis and gangrene Haemodynamic disorders including hemorrhage, shock, embolism and thrombosis.

Unit II: Infections

Tuberculosis - Leprosy and Typhoid.

Unit III: Deficiency diseases

Anaemias

Unit IV: Tumor Pathology

Tumors – Terminologies, Nomenclature. Differences between benign and Malignant tumors, Tumors – Etiology, pathogenesis and spread of tumors.

Unit V: Systemic Disorders

Heart: Coronary Heart Disease (Ischemic Heart Disease) including atherosclerosis
Congenital and Valvular Heart Diseases

Respiratory System- Bronchial Asthma, Emphysema, Bronchiectasis

Bone and Joints – Autoimmune diseases, septic arthritis, osteomyelitis, rheumatoid arthritis

Diseases of the Kidney - Diseases of other parts of the Urinary System

Central Nervous System CNS infections

Muscle - Diseases of muscle including poliomyelitis, myopathies

Gastrointestinal System Diseases of Esophagus, Stomach and Intestine, Diseases of Liver and Pancreas.

Reproductive system-Diseases of uterus, cervix, ovaries and testis.

Pathology Lab

Learning Objective:

The Gross specimens and instruments relevant to the disease processes and diseases taught will be shown and explained.

Unit I: Gross Specimens

1. Gangrene Bowel
2. Tuberculosis of Lung
3. Lipoma
4. Squamous cell Carcinoma of Foot
5. Infective Endocarditis
6. Left Ventricular Hypertrophy
7. Osteoclastoma
8. Osteogenic Sarcoma
9. Osteomyelitis
10. Chronic Pyelonephritis-Kidney

Unit II: Haematology Instruments:

1. Sahli's Haemoglobinometer
2. Sahli's pipette
3. Westergren's tube
4. Wintrobe's tube
5. Neubauer's Chamber
6. RBC pipette
7. WBC pipette

Recommended Textbook:

Textbook of Pathology, Harsh Mohan, 3rd edition

Course Outcomes:

C01:	Diagnose routine and complex clinical problems on the basis of histopathology (surgical pathology) and cytopathology specimens, blood and bone marrow examination and various tests of Laboratory Medicine (clinical pathology, clinical biochemistry) as well as Blood Banking (Transfusion Medicine).	
C02:	Interpret and correlate clinical and laboratory data so that clinical manifestations of diseases can be explained.	
C03:	Advise on the appropriate specimens and tests necessary to arrive at a diagnosis in a problematic case.	
C04:	Plan, execute, analyse and present research work.	
C05:	Correlate clinical and laboratory findings with pathology findings at autopsy, identify miscorrelations and the causes of death due to diseases	

Mapping of Program Outcomes with course outcomes

C0	P01	P02	P03	P04	P05	PS01	PS02	PS03
C01	✓	✓				✓	✓	
C02	✓	✓	✓			✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓	✓	✓			✓	✓	
C05	✓	✓	✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Microbiology	3	1	2	6

Course Objective:

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

1. Know the concepts of sterilization and disinfection procedures and their applications.
2. Understand the basic principles of immunology.
3. Understand the basic fundamental aspects of bacteria, virus, fungus and parasites, and study the common disease caused by them.

Unit I: Introduction

History and introduction to microbiology, study the morphology of bacterial cell and their functions.

Unit II: Basic concepts about infection

Source, portal of entry & spread of immunity, biomedical waste management and standard precautions

Unit III: Sterilization

Sterilization and disinfection procedures and their application.

Unit IV: Infections

Common bacterial, viral, fungal and parasitic pathogens and the diseases caused by them with preventive and treatment measures.

Unit V: Applied microbiology

Sexually transmitted diseases, hospital acquired infections, urinary tract infections, skin and soft tissue infections and anaerobic infections.

Recommended books

1. Prof C P Baveja - Text book of Microbiology.
2. Satish Gupte - Text Book of Microbiology

Microbiology Lab

Learning Objective:

This module aims at providing practical knowledge in the recognition of common pathogenic organisms, infectious diseases and their lab diagnosis.

1. Spotters:

- a) Disposable syringe
- b) Sterile cotton swab
- c) Bacterial filters
- d) Anaerobic jars
- e) Gramstained smears showing grampositive cocci and gram negative bacilli
- f) Gramstained smears showing Candida
- g) Culture growth of Aspergillus and dermatophytes
- h) Bacterial culture media plates (Blood agar, chocolate agar and MacConkey's agar)
- i) Antibiotic susceptibility test
- j) Ascaris lumbricoides
- k) Taenia

2. Clinical case discussion with charts:

- a) Skin and soft tissue infections
- b) Clostridia infections
- c) Ring worm/ Tinea infections
- d) Food poisoning
- e) Gastroenteritis

Learning outcomes:

At the end of the module, the student must be able to have brief practical knowledge on infectious disorders.

Recommended reading

Practical Microbiology - Prof. C.P. Baveja

Course Outcome

C01:	Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions..	
C02:	Students will also study the growth and control of microbes as well as different bacteriological techniques involved in microbiology.	
C03:	Students will learn about the biomolecules by studying their structures and types..	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓	✓			✓	✓	
C02	✓		✓			✓	✓	
C03		✓	✓			✓	✓	
C04	✓	✓	✓			✓	✓	
C05	✓	✓	✓			✓	✓	
AVERAG E								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Pharmacology	3	1	2	6

Course Objectives:

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

UNIT 1: Introduction

General pharmacological principles-Definition-Routes of drug administration-Pharmacokinetics-Pharmacodynamics-Adverse drug effects

UNIT 2: Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system

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

Skeletal muscle relaxants-Local anaesthetics, General anaesthetics -Ethyl & Methyl alcohol-Sedatives, Hypnotics

Antiepileptics-Antiparkinsonian drugs-Drugs used in mental illness-Opioid analgesics and Nonopioid Analgesics

Nonsteroidal Anti-inflammatory drugs

UNIT 3: Cardiovascular drugs, Drugs affecting Blood & Blood formation and Drugs on Respiratory system

Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Anti-hypertensives and Diuretics, Hematinic, Erythropoietin, Drugs affecting-coagulation, Fibrinolytic and Antiplatelet drugs, Treatment of cough and anti-asthmatic drugs

UNIT 4: Antimicrobial drugs

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

UNIT 5: Hormones & related Drugs, Drugs used in gastrointestinal diseases & miscellaneous drugs

Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhea and Treatment of peptic ulcer Vitamins, Vaccines, Sera and chelating agents.

Recommended books:

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

Pharmacology Lab

Learning Objective:

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

Instruments:

Needles Intravenous, Intrathecal, Spinal, Intra arterial

Students Discussion: Syringes, Tuberculin, Insulin, I.V cannula, Scalp. Veinset

Students Discussion: Enema can, Inhalers, Spacers, and Nebulizers

Students Discussion: Tablets – Enteric coated, Sustained release, Sub-lingual

Students Discussion: Capsules, Spansules, Pessary, Suppository

Students Discussion: Topical Preparation, Ointment, Lotion, Powder, Drops – eye / ear

Charts: Mechanism of action of drugs, adverse effects, toxicology

Spotters: drugs

Text books suggested for reading:

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

Course Outcome

C01:	Describe the history and scope of pharmacology	
C02:	Explain general pharmacological concepts such as pharmacodynamics and pharmacokinetics	
C03:	Explain neurotransmission and the role of neurotransmitters	
C04:	Explain the different Classes of drugs acting on sympathetic and parasympathetic system	
C05:	Explain the types of drug receptors and their signalling mechanism	
C06:	Explain the different Classes of drugs used in various disorders	
C07:	Explain the concept of drug addiction, drug tolerance , drug abuse , drug interactions and Pharmacovigilance	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓	✓			✓		
C02	✓		✓			✓		
C03	✓					✓	✓	
C04	✓	✓	✓			✓	✓	
C05	✓	✓	✓				✓	
AVERAGE								

Assessment Method:

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Medical Terminology & Record Keeping	2	-	-	2

COURSE OBJECTIVES:

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical or dread reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.

UNITS:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals
4. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
5. Interpret basic medical abbreviations/symbols.
6. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
7. Interpret medical orders/reports.
8. Data entry and management on electronic health record system.

Course Outcome

C01:	Interpret medical terms that apply to body systems, diagnosis, disease, and treatment accurately.	
C02:	Analyze medical terms for correct clinical application.	
C03:	Use medical terminology appropriately when speaking about a topic or case study.	
C04:	Write medical terms using correct spelling.	
C05:	Discuss health issues significant to society.	

Mapping of Program Outcomes with course outcomes

CO	P01	P02	P03	P04	P05	PS01	PS02	PS03
C01	✓						✓	
C02	✓	✓	✓			✓	✓	
C03	✓		✓			✓	✓	
C04		✓	✓			✓		
C05		✓						
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Basic Computers & Information Science	2	-	-	2

COURSE OBJECTIVES:

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data work sheet and PowerPoint presentation.

UNITS:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision- input devices),output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The CentralProcessing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass to rage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing ,minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing oftable, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
12. Application of Computers in clinical settings.

Practical on fundamentals of computers:

Learning to use MS office: MS word, MS Power Point, MS Excel.
To install different software.

Course Outcome

CO1:	Understand the meaning and basic components of a computer system.	
CO2:	To learn generation, classification and application of computers.	
CO3:	Knowledge of computer equipment, including both hardware and software.	
CO4:	To learn input devices and output devices in detail.	
CO5:	To learn memory and its types in detail. . CO6:	
CO6:	Knowledge of Software, its types and application package. 8. Use word-processing software (MS-Word), spreadsheet software (MS-Excel) and presentation software (MS-PowerPoint) to solve basic information systems problems.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓					✓		
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓				✓	✓	
CO4		✓	✓				✓	
CO5			✓			✓		
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

THIRD SEMSTER

		L	T	P	Credits
	Principles of Anesthesia I	2	1	2	5

COURSE OBJECTIVES:

Understand the key milestones and significant figures in the evolution of anesthesia.

Learn about the different medical gases used in anesthesia.

Understand safe handling, storage, and delivery of these gases.

To Familiarize with the layout and organization of the operating room.

Explore infection control measures specific to anesthesia practice.

Identify the components of an anesthesia machine.

Unit 1: Historical Perspective

1. Evaluation of Anaesthesia Practice
2. Anaesthesia equipment in India

Unit 2: Medical gas supply, storage and safety

3. Compressed gas cylinders
4. Cylinders
5. Central Pipeline systems
6. Diameter Index safety System
7. Standards for cylinders in India
8. Tests and checks on the Pipeline

Unit 3: The Operating Room Environment

9. Zones of Operation room
10. Environmental factors in operating room
11. Electrical safety
12. Surgical fires and Thermal injury

Unit 4: Anaesthesia Machine

13. High Pressure System
14. Intermediate Pressure System
15. Low Pressure System
16. Safety features of Anaesthesia machine
17. Machine checklist

Unit 5: Breathing Circuits

18. Classification- Mapleson
19. Circle System: Sodalime, Indicators
20. Oxygen Therapy: Types

Unit 6: Basic Anaesthetic equipments

21. Face masks & Airway laryngoscopes - Types, sizes
22. Endotracheal tubes - Types, sizes
23. Cuff system- Fixing, removing and inflating cuff
24. Checking tube position, complications.
25. General considerations: humidity & heat

Unit 7: Anaesthesia ventilator and Working**Principles Unit 8: Investigations**

26. Haematological & their significance
27. Liver function test
28. Renal function test and others
29. E.C.G.
30. Chest X - ray
31. Echocardiography
32. Angiography

Reference Text Books:

1. Short Textbook of Anesthesia by Ajay Yadav- Sixth edition
2. Manual of Anaesthesia for Operation Theater Technicians Ahanatha Pillai – Second edition
3. Understanding Anesthetic Equipment & Procedures: A Practical Approach by Dwarkadas K Baheti and Vandana V Laheri -Third edition
4. Understanding Anesthesia Equipment by Jerry A. Dorsch and Susan E. Dorsch –Fifth edition
5. E. Dorsch –Fifth edition

PRACTICALS/ DEMONSTRATION:

1. Cylinders
2. Suction apparatus
3. Endotracheal tubes
4. Laryngoscopes
5. LMA
6. Oropharyngeal airway, nasopharyngeal airway
7. Anesthesia machine- description, parts, safety features

Course Outcome

CO1:	Understand the basic concepts of anaesthesia in medical and allied sciences.	
CO2:	Acquire Knowledge of the anesthetic products.	
CO3:	Understand the principles and techniques in order to provide anesthetic services	
CO4:	Develop professional skills.	
CO5:	Acquire knowledge of clinical environment and administration.	

Mapping of Program Outcomes with course outcomes

CO	P01	P02	P03	P04	P05	PS01	PS02	PS03
CO1	✓	✓	✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4	✓		✓			✓	✓	
CO5	✓		✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Clinical Pharmacology	2	1	2	5

COURSE OBJECTIVES:

To understand the mechanisms of action, therapeutic uses, and adverse effects of various classes of drugs.

To administer medicines safely and accurately, and to monitor patients for the therapeutic and adverse effects of these medicines.

To maximize the benefits and minimize the risk of drugs to recipients.

To learn about drugs' history, source, physicochemical properties, dosage forms, methods of administration, absorption, distribution, and excretion.

To make a significant contribution to achieving the therapeutic goal of drug therapy.

To understand the factors that determine how an individual will respond to a specific drug and dosage.

UNITS:

ANTISIALAGOGUES

Atropine, Glycopyrrolate

SEDATIVES I ANXIOLYTICS

Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, Trichlopho

NARCOTICS

Morphine, Pethidine, Fentanyl, Pentazozine

ANTIEMETICS

Metaoclopramide, Ondansetron, Dexamethasone

ANTACIDS

Na citrate, Gelusil, Mucaine gel.

H2 BLOCKERS

Cimetidine, Ranitidine, Famotidine

INDUCTION AGENT

Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate.

MUSCLE RELAXANTS

Depolarising - Suxamethonium,

Non depolarising -Pancuronium, Vecuronium, Atracurium, rocuranium

INTRODUCTION TO GENERAL ANAESTHESIA INHALATIONAL

Gases - O₂, N₂O, Air

Agents - Ether-, Halothane, Isoflurane, Sevoflurane, Desflurane

REVERSAL AGENTS

Neostigmine, Glycopyrrolate, Atropine, Nalorphine, Naloxone, Flumazenil (Diazepam)

ANTISEPTICS AND DISINFECTANTS STERILISATION AND CLEANING OF SURGICAL EQUIPMENTS

LOCAL ANAESTHETICS

Xylocaine, Preparation, Local – Bupivacaine - Topical, Prilocaine-jelly, Emla - Ointment,

Etidocaine. Ropivacaine

EMERGENCY DRUGS

1. Adrenaline: Mode or administration, dilution, dosage,
2. Effects, Isoprenaline
3. Atropine, bicarbonate, calcium, ephedrine, xylocard,
4. **Inotropes:** dopamine, dobutamine, amidaron
5. Aminophylline, hydrocortisone, antihistamines, potassium.
6. Cardiovascular drugs
7. Antihypertensive
8. Antiarrhythmic
9. Beta - Blockers
10. Ca - Channel blockers.
11. Vasodilators - nitroglycerin & sodium nitroprusside
12. Respirator system - Bronchodilators, respiratory stimulants Broncho lytic agents
13. Renal system - Diuretics, furosemide, mannitol
14. Obstetrics - oxytocin, methergin
15. Miscellaneous - Antibiotics NSAIDs Anticoagulants and Insulin

SYLLABUS FOR PRACTICALS:-

Drugs, OSPE charts

Reference books:

1. Essential of Medical pharmacology by K.D.Tripathi – Eighth edition
2. Textbook of Pharmacology by Padamaja udayakumar – Fifth edition
3. Shanbang pharmacology by Tara V Shabhang and Smit Shenoy– Fourth edition

Course Outcome

C01:	The students will be capable of Understand the Pharmacological aspects of drugs acting on nervous system, blood and renal system.	
C02:	The students will Know the pharmacological and therapeutic aspects of antimicrobial agents C03: The students will appreciate the importance of Emergency drugs	
C03:	The students will understand the importance of various anesthetics agents	
C04:	The students will be able to apply the knowledge of drugs and its functions to in clinical practice.	
C05:	The students will be capable of Understand the Pharmacological aspects of drugs acting on nervous system, blood and renal system.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
C01	✓		✓			✓	✓	
C02	✓	✓	✓			✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓	✓				✓	✓	
C05	✓					✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Medicine	2	1	2	5

COURSE OBJECTIVES:

Understand heart-related conditions and their impact on patient health.

Concentrate on diseases affecting the lungs and airways.

Address issues related to digestion and liver function. Deal with hormonal imbalances and metabolic conditions.

Focus on kidney and urinary tract health. Understand renal function and disorders.

Concerned with blood-related issues.

UNITS:

- **Cardiovascular disorders:** Hypertension, Ischemic Heart disease, Heart failure, Valvular Heart disease, Arrhythmias and peripheral vascular disease.
- **Respiratory disorders:** Chronic obstructive Pulmonary [COPD], Asthma, Pneumonia
- **Gastrointestinal and Liver disorders:** Gastroesophageal reflux Disease [GERD], Peptic ulcer disease, inflammatory bowel disease, Cirrhosis and viral hepatitis.
- **Endocrinology and Diabetes:** Diabetes Mellitus, Thyroid disorders
- **Nephrology and Urology:** Acute and Chronic kidney diseases, Glomerular disorders, urinary tract infections and renal stones.
- **Hematology:** Anemia, Hemostasis and Thrombosis.

Reference books:

1. Manipal Prep Manual of Medicine by Manthappa M – Third edition
2. Davidson's Principles and Practice of Medicine, International Edition, 24e by Ian Penman, Stuart H. Ralston, and Mark Strachan – 24th edition

PRACTICALS: Specimens, ECG, Clinical case presentation

Course Outcomes:

CO1:	To understand about improvements of standard of living and in medical treatment and specific measures to reduce the incidence of disease.	
CO2:	Students also gain knowledge about causes, signs & symptoms, investigations, and treatment	
CO3:	Demonstrate knowledge of the various causes (genetic, developmental, metabolic, toxic, microbiologic, autoimmune, neoplastic, degenerative, and traumatic) of maladies and the ways in which they operate on the body (pathogenesis).	
CO4:	Demonstrate knowledge of the altered structure and function (pathology and pathophysiology) of the body and its major organ systems that are seen in various diseases and conditions.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓	✓	
CO2	✓		✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4	✓	✓				✓	✓	
CO5	✓	✓	✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Psychology	1	-	-	1

COURSE OBJECTIVES:

Describe the theories and basic principles in psychology

Explain the behavior and mental processes.

Apply the principles of psychology while providing health care and enrich their knowledge and to meet the challenges they encounter in health care profession.

UNIT 1: Basic Concepts of Psychology

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

UNIT 2: Learning principles and methods

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

UNIT 3: Motivation, Emotion, Memory and forgetting

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

UNIT 4: Development, Sensory Processes and Perception.

Erikson's stages of psychosocial development Lawrence Kohlberg's stages of moral development Freud's Stages of Psychosexual Development Physiological basis of behavior – The brain and nervous system –The sensory process , Some general characteristic of senses – Five senses, Perception: Organization – The role of learning in perception – Perception and attention – Perceptual process. 25

UNIT 5: Intelligence & Personality

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

UNIT 6: Social Psychology

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

UNIT 7: Health Psychology

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

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

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

REFERENCES:

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler,“**Introduction to Psychology**” – 7th Edition. Tata McGraw Hill Book Co. New Delhi, 1993.
2. Baron, R. A., & Byrne, D (2006), “**Social psychology**”, New Delhi: Prentice hall of India private limited.
3. Elliot Aronson, Timothy D. Wilson, Robin M. Akert, Samuel R. Sommers, “**Social psychology**” 9th edition published by Pearson education, Inc.,2006
4. Shelley E. Taylor. “**Health Psychology**” Third Edition. McGraw Hill International Editions, 1995.
5. Swaminathan, V.D, Latha Sathish, “**Psychology for Effective Living**”, Department of Psychology, University of Madras.
6. Coleman, James. 1980. “**Abnormal Psychology and modern life**”. New Delhi: Tata McGraw Hill Ltd.

Course Outcomes:

CO1:	Apply psychological principles to everyday life.	
CO2:	Draw appropriate, logical, and objective conclusions about behavior and mental processes from empirical evidence.	
CO3:	Evaluate misconceptions or erroneous behavioral claims based on evidence from psychological science.	
CO4:	Design, conduct, or evaluate basic psychological changes in patient.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
C01		✓	✓			✓		
C02	✓	✓	✓			✓	✓	
C03	✓	✓	✓				✓	
C04	✓	✓					✓	
C05		✓				✓		
AVERAG E								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	

	Laboratory Techniques	L	T	P	Credits
		1	-	-	1

COURSE OBJECTIVES:

- To obtain blood samples for laboratory analysis.
- To understand and diagnose disorders related to blood cell formation.
- Comprehensive assessment of blood components.
- Evaluate blood clotting ability.
- Determine blood group compatibility.
- Assess oxygen-carrying capacity and blood volume.
- Measure essential ions.
- Assess blood sugar levels. Evaluate kidney function. Confirm pregnancy.
- Diagnose specific conditions.
- Diagnose respiratory diseases.

UNITS:

- Collection of blood - venous, arterial & capillary,
- Abnormal haematopoiesis- Erythropoiesis, Leucopoiesis & Thrombopoiesis, Complete Blood Count
- Coagulation profile – PT, PTT, INR
- Blood grouping and Typing
- Hemoglobin and Hematocrit measurement

- **Electrolyte Analysis**
- **Glucose levels**
- **Renal:** Serum, creatinine and Blood urea Nitrogen[BUN], Urinalysis
- **Liver:** ALT, AST, Bilirubin, ALP, Albumin and Totalprotein
- **Pregnancy Test**
- **Arterial Blood Gas**
- **Body Fluids:** CSF, Semen, Fine Needle Aspiration
Cytology[FNAC] - Pleura, Peritoneum, Pericardium Swab-
Vaginal, Nasopharyngeal, PCR: RT-PCR
- **Sputum analysis:**
- **Indication** – Method of Collection, Sputum examination

Reference books:

Medical Laboratory Technology Procedure Manual for Routine Diagnostic Tests by Kanai L. Mukherjee - 4th edition

PRACTICALS/ DEMONSTRATION:

- Collecting, preparing, and storing specimens for testing
- Operating and maintaining laboratory equipment and instruments
- Performing quality control and calibration of tests and procedures
- Recording and reporting test results to physicians and other health care providers
- Following safety and infection control protocols in the laboratory

Course Outcome

CO1:	Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.	
CO2:	Adapt hematology laboratory techniques and procedures when errors and discrepancies in results are obtained to effect resolution in a professional and timely manner.	
CO3:	Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.	
CO4:	Recognize laboratory results consistent with leukemia and other white blood cell disorders.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓		
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4			✓				✓	
CO5	✓							
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

FOURTH SEMESTER

	L	T	P	Credits
Principles of Anesthesia II	2	1	2	5

COURSE OBJECTIVES:

- Describe the fundamentals of General and Regional anesthesia
- Demonstrate the airway management techniques in mannequins under supervision
- Perform pre anesthetic assessment under supervision
- Describe the procedures of Regional and general anesthesia
- Observe the regional anesthesia
- Demonstrate various monitoring skills

UNITS:

- **Local Anaesthesia:**
Classification of LA, Mechanism of action, Systemic effects and toxicity, Commercial preparations, uses, Types, Methods of Local Anaesthesia
- **Spinal Anaesthesia:**
Applied Anatomy, Positions, procedure, Sub-Arachnoids block (Intrathecal block), Spinal Anaesthesia in Children, Spinal Needle, techniques, post op complications
- **Epidural Anaesthesia:**
Peridural block, positions, Procedure, Combined Spinal and Epidural Anaesthesia, Caudal Block, Epidural Techniques, Post op complications
- **Nerve Blocks:**
Techniques, Blocks of Upper Limb, Blocks of Lower Limb, Invasive and Non Invasive monitoring
- **General Anaesthesia:**
Patient history, Stages of anaesthesia, Monitored Anaesthesia Care, Total Intravenous Anaesthesia
- **Standards of Monitoring:** Invasive and Non-Invasive monitoring
- **Anaesthesia Ventilator and working Principle.**
- **Preoperative preparations/Assessments:**
Patient History, ASA Classification, NPO Status, Informed Consent Airway Assessment.
- **Intraoperative management:**
Positioning of patient, Monitoring, Maintenance of Anaesthesia, IV fluids and Blood transfusions.
- **Postoperative Complications and management.**

Reference Books:

1. Short Textbook of Anesthesia by Ajay Yadav- Sixth edition

2. Manual of Anaesthesia for Operation Theater Technicians Ahanatha Pillai
Second edition
3. Understanding Anaesthesia Equipment: By Jerry A. Dorsch – Lippincott Williams and Wilkins publishers, 5th Edition
1. Lee's Synopsis of Anaesthesia, 15th edition by Jeremy N. Cashman and Michael J. Grounds.
2. Berry & Kohn's Operating Room Technique, 14th edition by Nancy Marie Phillips.
3. Clinical Anesthesia, 8th edition by Paul G. Barash, Michael K. Cahalan, Bruce F. Cullen, M.

PRACTICALS/ DEMONSTRATION:

1. Learning how to perform various types of anaesthesia, such as general, regional, local, and sedation, and how to select the appropriate anaesthetic agent and dose for each patient and procedure.
2. Practicing how to insert and manage different types of airway devices, such as endotracheal tubes, laryngeal masks, and supraglottic airways, and how to perform intubation and extubation safely and effectively.
3. Developing skills in monitoring and assessing the vital signs, oxygenation, ventilation, and hemodynamics of patients during anaesthesia and surgery, and how to intervene in case of any complications or emergencies.
4. Demonstrate patient care skills, including transferring, positioning, monitoring and transporting patients.
5. Gaining experience in working as part of a multidisciplinary team, and communicating and collaborating with surgeons, nurses, technicians, and other healthcare professionals in the perioperative setting.

COURSE OUTCOME:

C01:	Understanding of the basic principles and techniques of anaesthesia including the different types of anaesthesia, their indications, and the techniques used to administer them.	
C02:	Ability to monitor and maintain the safety of patients during anaesthesia, including the use of monitoring equipment, checking vital signs, and ensuring proper oxygenation and ventilation.	
C03:	Familiarity with the equipment and technology used in anaesthesia, including breathing circuits, anaesthesia machines, and ventilators.	
C04:	Understand the role of an anaesthesia technician in the operating room, including their responsibilities, duties, and the team-based approach to patient care	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓		✓			✓	✓	
C02	✓	✓	✓			✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓	✓	✓			✓	✓	
C05	✓		✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Clinical Microbiology	3	1	2	6

COURSE OBJECTIVES:

Classify microorganisms, discuss the morphological and growth characteristics and its association with causation of disease.

Demonstrate and interpret basic laboratory techniques used in the detection of microorganisms.

Explain principles of antimicrobial therapy and Immunization.

Demonstrate basic infection control practices.

UNITS:

- 1. Sterilization & decontamination**
 - Dry Filtration
 - General Principles Asepsis
2. Wound Infection & Urinary Tract Infections
3. Blood stream Infections
4. Respiratory tract Infection
5. S.Typhi, Salmonella Paratyphi 'A', Salmonella Typhimurium
6. Catheter, IV associated Infections
7. Hospital acquired infections & prevention of hospital acquired infections
8. Hepatitis C, HBV, HIV
9. Hypersensitivity reaction – Type I, II, III, IV
10. Biomedical Waste Management

Reference books:

1. Ananthanarayan and Paniker's Textbook of Microbiology by RAnanthanarayan and CK Jayaram Panike – 12th edition
2. Essentials of Medical Microbiology by Apurba Sankar Sastry and Sandhya Bhat – Seventh edition
3. Textbook of Microbiology Baveja 5th edition (2017)

SYLLABUS FOR PRACTICALS

Biomedical waste management, color code OSPE charts

COURSE OUTCOME:

CO1:	Understand the diversity of microorganisms and their role in the environment, human health, and industrial processes.	
CO2:	CO2: Understand the basic structures and functions of microorganisms, including their cellular and molecular biology.	
CO3:	Apply the methods used for the isolation, cultivation, and identification of microorganisms.	
CO4:	Learn about the interactions between microorganisms and their hosts, including the mechanisms of pathogenesis and the host immune response.	
CO5:	Acquire knowledge about the principles and applications of sterilization, disinfection, and infection control	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓		✓			✓	✓	
CO4	✓	✓	✓			✓	✓	
CO5	✓					✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

	CSSD Including Sterilization	L	T	P	Credits
		2	1	2	5

COURSE OBJECTIVES:

Contribute to a team of central sterile processing professionals who are all working together to maintain sterilization and storage.

To prepare CSSD professionals to practice appropriate Infection control protocols.

To update the latest standards, guidelines and best practices of instrument reprocessing.

UNIT: I

Role of CSSD in health care delivery, planning and layout, decontamination: scientific principle and recommended practices, water quality and its impact in CSSD procedure, HAVC (heat, air, ventilation, cooling) system and its impact.

UNIT: II

Principles of sterilization and disinfection. Methods of sterilization: Dry Sterilization, Wet sterilization, Gaseous sterilization, Chemical sterilization, Radiation sterilization, call back system in case of detection of failure.

UNIT: III

Packaging material – textiles, management of surgical linen, packaging materials, rigid containers, packaging selection and use, packaging shelf life, assembly of sets/linen, dressing materials and standard recommendations

UNIT: IV

Sterilization operation and techniques-Techniques of sterilization of rubber articles (LMA, FOB, ETT, Laryngoscopes, Anaesthesia machines and circuits, Technique of sterilization of carbonized articles).Methods of disinfection, Boiling, Chemical disinfection, Hazards of sterilization.

UNIT: V

Prevention of hazards of sterilization. Precautions to be taken during Sterilization. Recent advances in the methods of sterilization – plasma and ozone sterilization. Sterilizer validation.

Reference Textbook:

1. Hospitalsterilization. Prem Anand Nagaraja. 2011. 1st edition Jaypee publishers
2. T.D. Whittet .Sterilization & disinfection. Pharmaceutical monographs

PRACTICAL:

- Cleaning & packing equipment,
- How to work on autoclave.
- How to sterilize using ETO
- Assembly of sets/ linen
- Sterilizer operation
- Trouble shooting sterilizer

Course Outcome

C01:	Responsible for caring for all the surgical instruments and additionally their disinfection and sterilization.	
C02:	Student learns efficiently on how to use sterilization techniques to sterilize instruments and redistribute them for future use.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
C01	✓		✓			✓	✓	
C02	✓	✓	✓			✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓	✓				✓	✓	
C05	✓					✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Ethical and Legal Issues	1	-	-	1

COURSE OBJECTIVES:

Identify the major ethical frameworks, including principle ethics and virtue ethics, and apply ethical principles to individual, group, and family counseling situations with a sensitivity to multicultural and social justice considerations.

Apply policies, regulations, legislation and federal and state laws pertinent to mental health, school, and rehabilitation counseling.

Recognize implications for legal liability and malpractice.

Identify issues and requirements for professional credentialing, licensure, certification, registry, and program accreditation

UNIT I

Medical ethics - Definition, Goal, Scope.

Introduction to Code of conduct. Basic principles of medical ethics Confidentiality.

UNIT II

Malpractice and negligence Rational and irrational drug therapy Autonomy and informed consent – Right of patients

UNIT III

Care of terminally ill- Euthanasia. Organ transplantation.

UNIT IV

Medico legal aspects of medical records – Medico legal case and type- Records and document related to Medico Legal Case (MLC) - ownership of medical records - Confidentiality Privilege communication - Release of medical information – Unauthorized disclosure - retention of medical records - Other various aspects.

UNIT V

Professional Indemnity insurance policy

Development of standardized protocol to avoid near miss or sentinel events

REFERENCE TEXT BOOK:

1. Ethical issues in health care sector in India- Chirantan chattergee

COURSE OUTCOME:

CO1:	Comprehend and apply key legal principles governing the doctor-patient relationship	
CO2:	Critically evaluate ethical and legal dilemmas faced by medical practitioners	
CO3:	Conduct client interviews to practice and develop legal communication skills and professionalism	
CO4:	Formulate written legal advice to clients facing (simulated) legal dilemmas in their medical practice; and	
CO5:	Articulate and develop persuasive legal arguments on complex and contentious medico-legal issues.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4		✓	✓					
CO5		✓						
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Patient Monitoring	1	-	-	1

COURSE OBJECTIVES:

This course aims to equip participants with the knowledge and skills necessary for effective patient monitoring, considering legal, ethical, and technological aspects

UNIT 1: CLINICAL MONITORING

PR, BP, RR, Temperature, Urine output

UNIT II: NON INVASIVE

ECG, SPO2, NIBP, ETCO2, NM Monitor

UNIT II : INVASIVE

IBP, CVP, PCWP, ICP, RA, LA

UNIT IV:

Gas monitors, Anaesthesia depth monitors: Entopy, BIS

UNIT V:

Monitoring ventilated patient

REFERENCE TEXT BOOK:

The ICU book. Paul L Marino. 4th edition. Lippincott Williams &wilkins

PRACTICALS:

- Diagnosing critically ill patient
- PR, BP, RR, Temperature, ETC O2, Urine output, Pulse oximeter
- InterpretationofECG, ABG
- Invasive monitoring, CVP, NIBP, Cardiac output, IABP

COURSE OUTCOME:

CO1:	Define and understand the scope of medicine and patient monitoring.	
CO2:	Adhere to legal and ethical considerations in monitoring practice.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓		✓			✓	✓	
C02	✓	✓	✓			✓	✓	
C03								
C04								
C05								
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

FIFTH SEMESTER

	Anaesthesia For Specialities I	L	T	P	Credits
		3	1	2	6

COURSE OBJECTIVES:

Describe various monitoring in cardio thoracic and neuro surgery.

Demonstrate ACLS and BLS in emergency lifesaving support and trauma patient.

Analyze the special investigations in cardiac thoracic care.

Apply knowledge about advance pulmonary support ECMO and ventilation

Comprehend the management of cardio thoracic and neuro surgery patient

UNIT I

Cardiac anesthesia –PART 1 NYHA classification, Arrhythmias, Angina, Dyspnoea, Premedication, Setting up of monitoring system, Monitoring – invasive and non-invasive.

UNIT II

Cardiac anesthesia –PART 2 Getting ready for the case, Induction of cardiac patient, precautions to be taken, Transferring the patient to ICU, Care to be taken, ICU management

UNIT – III

Neuro Anesthesia- Glasgow coma scale, Signs of raised ICT, Premedication, Check list, Induction of a patient Positioning in neuro surgery, I.C.P monitoring, Air embolism, Transferring to I.C.U / ward

UNIT – IV

Anaesthesia for Trauma & Shock Resuscitation, Preoperative investigation/assessment, Circulatory management, Management of anaesthesia, Rapid sequence induction, other problems.

UNIT – V

ENT Anaesthesia

- Anaesthesia for adenotonsillectomy
- Anaesthesia for mastoidectomy
- Bronchoscopy and oesophagoscopy

Reference Text Books:

1. Nurse Anesthesia, John J. Nagelhout, Karen L. Plaus, 5th edition, Elsevier Health Sciences, 2014
2. Basics of Anesthesia, Ronald D. Miller, Manuel Pardo, 6th edition, Elsevier Health Sciences, 2011

3. Anaesthesia and Neurosurgery by James E. Cottrell, Mosby-Year Book publishers;
3rd edition

PRACTICALS:

- Positioning patients for different surgery
- Getting equipments ready
- Monitoring patients
- Safe shifting of patients

Course Outcome

CO1:	To be able to develop clinical competency in anaesthesia technology, allowing them to safely and effectively administer anaesthesia to patients and monitor their vital signs during procedures.	
CO2:	Acquire knowledge about different types of anaesthesia, including local, regional, and general anaesthesia, and how to administer them in various clinical settings.	
CO3:	Exposure to the latest technology and equipment used in anaesthesia technology, including anaesthesia machines, monitoring devices, and ventilators.	
CO4:	Learn how to manage emergency situations, such as respiratory or cardiovascular complications, during anaesthesia procedures.	
CO5:	Understanding about the importance of patient-centred care in anaesthesia technology and how to prioritize patient comfort and safety during procedures.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
CO1	✓		✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4		✓	✓			✓	✓	
CO5		✓	✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

	Principles of Sterilization Techniques	L	T	P	Credits
		3	1	2	6

COURSE OBJECTIVES:

Learn how to sterilise, pack and wrap medical equipment and work in decontaminated areas.

Contribute to the safety functions of hospitals as you work closely with operating theatres and keep up with emerging medical robotic technologies.

UNIT – I

Layout of OT and Lighting of OT

UNIT II

Cleanliness and sterilization of OT and Anesthesia- Carbolization, fumigation, principles of sterilization – autoclaving, pressure sterilization, boiling, dry heat, gas chemical sterilization, gamma rays sterilization

UNIT – III

OT preparation

Preparation of spinal /epidural/nerve block tray.

Preparation of patients for various types of anesthesia including laying out of trolleys, preparation of Boyle’s apparatus for administration of anesthesia.

Precaution to reduce antistatic friction hazards, preparation of sterile field, special precautions in handling patients with sepsis, blood borne infections – Hepatitis B, HCV, HIV, etc,

Cleaning and Disinfection of articles and OT various positions during surgeries - lithotomy/kidney/beach chair/lateral/prone.

UNIT – IV

Electrical and fire hazards- Prevention of physical, electrical, chemical injuries and hazards to patients OT pollution and scavenging

UNIT – V

Care and Maintenance of Operation records of OT- Maintenance of septic OT, Use and maintenance of defibrillator, cautery, OT light, suction, emergency light etc., Admission and transfer procedures

Text Books:

1. Principles and Methods of Sterilization in Health Sciences, John J. Perkins, 2nd edition, Charles C Thomas Pub Limited, 1983
2. Fundamentals of Surgical Practice, Aljafri A. Majid, Andrew N. Kingsnorth, 1st edition, Cambridge University Press, 1998

PRACTICALS/ DEMONSTRATIONS:

1. Disinfectants
2. Methods of sterilization
3. Various positions in surgery

Course Outcome

CO1:	Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures	
CO2:	Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes and also Understand the structural similarities and differences among various physiological groups of bacteria/archaea	
CO3:	Know various Culture media and their applications and also understand various physical and chemical means of sterilization	
CO4:	Master aseptic techniques and be able to perform routine culture handling tasks safely and effectively	

Mapping of Program Outcomes with course outcomes

CO	P01	P02	P03	P04	P05	PS01	PS02	PS03
CO1	✓		✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4	✓		✓			✓	✓	
CO5								
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Airway Care And Oxygen Therapy	2	-	-	2

COURSE OBJECTIVES:

Assessing vital signs respirations, pulse, oxygen saturation

Level of consciousness

Selecting and preparing correct oxygen equipment

Administering oxygen safely at correct flow rate

Managing an equipment malfunction

Providing an accurate verbal and written report of the incident

Reviewing the incident

1. Airway Care

Indications for artificial airways - Relieving airway obstruction - Secretion removal - Protecting the airway - Positive Pressure Ventilation

Lung Volumes & Capacity • Gas exchange & transport- oxygen, carbon dioxide - Diffusion - O₂ Transport and abnormalities - CO₂ Transport and abnormalities • Pressure, Volume • Resistance, Compliance • Ventilation and Perfusion, V/Q ratio • Gas exchange, mechanism of diffusion

2. Equipments

Selecting and establishing an artificial airway - nasal airways - pharyngeal airways – tracheal airways, supraglottic airway devices, infraglottic airway devices.

3. Airway clearance techniques – Airway suctioning - Bronchoscopy

4. Airway maintenance - Securing the airway and confirming placement - Providing adequate humidification - Minimizing nosocomial infections - Providing cuff care – Facilitating clearance of secretions - Troubleshooting airway emergencies

5. Extubation - Indications - Procedure - Post extubation care & complications

6. Oxygen Therapy - Sources of oxygen for therapy - Storage of oxygen - Oxygen delivery systems - Hazards of oxygen - Modes of O₂ therapy - Monitoring O₂ delivery systems (in vitro) blood gases in patient (in vitro.) - Pulse oximetry - Economic issues

REFERENCES BOOKS:

- Airway Management – Rashid M Khan
- The ICU book – Paul Marino
- Egan’s Fundamentals of Respiratory Care – Robert L. Wikins, James K

- Stoller, Craig L Scaln (Mosby)
- Practical Methods for Respiratory Care – Raymond Sibberson (Mosby)

COURSE OUTCOME:

CO1:	Respond to an emergency situation	
CO2:	Perform resuscitation procedures	
CO3:	Deliver oxygen therapy	
CO4:	Communicate details of the incident	
CO5:	Review the incident	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓	✓	
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4	✓	✓				✓	✓	
CO5	✓					✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Basics of Biomedical Engineering	2	-	-	2

COURSE OBJECTIVES:

Continue to utilize and enhance their engineering and biological training to solve problems related to health and healthcare that are globally relevant and based on ethically sound principles.

UNIT-I: PHYSIOLOGICAL SIGNALS AND ITS CHARACTERISTICS

Physiological systems of the body, sources of bio medical signals, Origin of bioelectric signals-ECG, EEG, EM, electrode –tissue interface, types of electrodes, pressure transducer, thermistor, Photoelectric transducer, optic fibre sensors

UNIT-II: MEDICAL IMAGING TECHNIQUES

X ray machine, Computed tomography, different generations Ultra- sonography: A, B and M mode scans, Magnetic resonance Imaging system PET, SPECT, thermography

UNIT-III: CARDIAC PACEMAKERS AND DEFIBRILLATORS

Basics of cardiac pacemakers, external pacemaker
Implantable pacemaker-types, programmable pacemaker, power sources, DC defibrillator, Automatic external defibrillator

UNIT-IV: NON-ELECTRICAL PARAMETER MEASUREMENTS

Measurement of blood pressure: direct and indirect methods, Blood flow measurements: electromagnetic blood flow meter, ultrasound blood flowmeter, laser Doppler blood flowmeter, cardiac output measuring techniques: dye dilution method, thermal dilution method, Heart rate measurement

UNIT-V ELECTRICAL HAZARDS AND PATIENT SAFETY

Electrical shock hazards, micro and macro shock, Leakage current and its types,

Safety codes for electro medical equipments and electrical safety analyzer, testing of biomedical equipment.

Reference books:

1. Biomedical Engineering: A Practical Approach by Satish Chandra
2. Biomedical Instrumentation and Measurements by Leslie Cromwell, Fred J. Weibell, and Erich A. Pfeiffer – Second edition

COURSE OUTCOME:

C01:	Ability to identify, formulate, and solve complex engineering problems	
C02:	Ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	
C03:	An ability to communicate effectively with a range of people.	
C04:	Ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓	✓	✓			✓	✓	
C02			✓			✓		
C03		✓					✓	
C04		✓	✓					
C05								
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	

SIXTH SEMESTER

	Anesthesia For Specialities II	L	T	P	Credits
		3	1	2	6

COURSE OBJECTIVES:

Discuss the indication and contraindication of day care anesthesia.

Describe labor analgesia pain management.

Analyze PDPH Cause and management.

Apply various type and size calculation tube for pediatric and intra-operative management.

Demonstrate the competency in handling patients with various disease of aging in geriatric anesthesia.

UNIT-I

Obstetric Anaesthesia (Part 1) - Differences between a pregnant and a normal lady, Risks for anaesthesia, Precautions to be taken, Check list, Regional vs general anaesthesia, Induction / maintenance

UNIT-II

Obstetric Anaesthesia (Part 2)- Resuscitation of the new born, APGAR score, Reversal and extubation, Emergencies – Manual removal of placenta, A.P.H,- P.P.H., Ruptured uterus, Ectopic pregnancy, Labour, Epidural analgesia

UNIT-III

Paediatric Anaesthesia - Theatre setting, check list, Premedication, Induction, Intubations-securing the ETT, Monitoring, Reversal & extubation – problems, Transferring / IC management, Pain management.

UNIT-IV

Day Care Anaesthesia - Special features, Set up, Advantages, Disadvantages, Complications, Future

UNIT-V

Anaesthesia Outside the O.R- Situations, Cath lab, Radiology and Imaging Science Technology natural calamities, E.C.T, Features, Shortcomings, Complications

UNIT V - UROLOGY, PLASTIC SURGERY & TRANSPLANT SURGERIES

- Common Urosurgical procedures, positioning for urosurgery
- TURP syndrome
- Common surgeries posted for plastic repair
- Positioning,
- The burns patient,
- Coping up with long hours of surgery
- Kidney transplant, Pancreas transplant,
- Heart transplant

- Lung transplant, Bone marrow transplant,
- Hemodynamic monitoring and intravascular access.

Reference Text Books:

1. Nurse Anesthesia, John J. Nagelhout, Karen L. Plaus, 5th edition, Elsevier Health Sciences, 2014
2. Basics of Anesthesia, Ronald D. Miller, Manuel Pardo, 6th edition, Elsevier Health Sciences, 2011

PRACTICALS/DEMONSTRATIONS:

- Spotters –common obstetric emergencies
- Charts- situations requiring anesthesia outside operation theatre
- Demonstration-how is pediatric anesthesia different from adult.

Course Outcome

C01:	Demonstrate knowledge and understanding of common surgical problems.	
C02:	Demonstrate an understanding of surgical treatments, and alternatives to surgical treatment.	
C03:	To become familiar with various surgical procedures and know their expected outcomes and complications.	
C04:	Be familiar with action, dosage and use of common pharmacologic agents used in surgery (analgesics, antibiotics, anticoagulants, sedatives)	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
C01	✓					✓	✓	
C02	✓	✓				✓	✓	
C03	✓	✓	✓			✓	✓	
C04	✓		✓			✓	✓	
C05	✓		✓			✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Anaesthesia for Trauma & Emergency	3	1	2	6

COURSE OBJECTIVES:

Emergency anesthesia aims to correct surgical pathology while minimizing risks to the patient.

Careful consideration of the patient's history, clinical examination, and special investigations is essential.

Identify and address life-threatening injuries.

Stabilize vital signs.

Assess the extent of other injuries.

Prepare the patient for definitive care, which may involve transport to another medical centre.

UNIT I

EMS principles

Pre- hospital care of trauma victim.

Transport of a patient from home/field to tertiary care hospital. Common conditions encountered in emergency

Triage

UNIT II

Management of bleeding patient

Diagnosis, Investigations, Medical and surgical management

UNIT III

Urgent interventions in acute trauma care, Chest X-ray, CT scan, FAST scan, Investigations

UNIT IV

ATLS, Medico legal issues, certification of death,

Recognizing brain dead, Preservation of functions in a brain dead donor

UNIT V

Emergency procedures-ICD insertion, Tracheostomy, Stomach wash, SPC insertion, Emergency surgeries

REFERENCE TEXT BOOKS:

1. Bailey & Love's Short Practice of Surgery
2. ATLS, Advanced Trauma Life Support for Doctors

PRACTICALS:

1. TRIAGE
2. ATLS (Advanced Trauma Life Support)
3. Recording vitals
4. Assessing pupils
5. GCS (Glasgow Coma Scale)
6. Checking bleeding
7. Safe lifting cots and stretchers
8. Log rolling
9. IV access, mask ventilation and intubation, Getting tray set for ascetic fluid paracentesis, SPC, haemodialysis
10. Assisting in inserting central line, dialysis catheter & arterial line

COURSE OUTCOME:

CO1:	Know anaesthetic implications in different medical conditions.	
CO2:	Assist in anaesthetic management of different surgical procedures.	
CO3:	Understand the anaesthetic implications in Obstetrics Gynecological and Pediatric Surgeries	
CO4:	Know anaesthetic implications in different medical conditions.	
CO5:	Learn special considerations and postoperative care in thoracic surgeries	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
CO1	✓		✓			✓	✓	
CO2	✓		✓			✓	✓	
CO3	✓	✓	✓			✓	✓	
CO4	✓	✓	✓			✓	✓	
CO5	✓	✓				✓	✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Medical Imaging	-	-	-	-

UNIT I: X-ray

Discovery of x-rays, properties, production, Modern x-ray tubes, heel effect, off focus radiation, tube insert and housing. Tube rating, Quality and intensity of X- rays. X-ray Film, properties, composition and their types. X-ray Intensifying screen, properties, composition and their types. X-ray Film Processing, infrastructure and equipments.

UNIT II: Fluoroscopy

Direct fluoroscope and Image intensifier design. Imaging characteristics, multi field images intensifiers, Close circuit television, television scanning and television image quality. Fluoroscopic image recorders. Digital fluoroscopy system, digitized image, digital subtraction techniques and digital image processing.

UNIT III: Computed Tomography (CT)

Basic principle, data accumulation, image reconstruction, storing the image, viewing the image and evaluation of image. Equipment for tomography, table- gantry, x-ray generator, different generations. Image quality, patient exposure and artifacts.

UNIT IV: Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging, basic principle, Instrumentation, Magnetic field gradient coils, Spin echo imaging sequence, multi slice imaging, multi echo imaging, contrast, multi planar imaging, inversion recovery pulse sequence, signal to noise ratio, fast imaging techniques and safety considerations.

UNIT V: Ultrasonography (USG)

Physical characteristics of sound, transducer, characteristics of ultrasound beam, interaction of ultrasound and matter, quarter wave matching, ultrasonic display, imaging principles, Doppler techniques, real time ultrasound. Ultrasound instrumentation, bio effects and safety considerations.

REFERENCE TEXT BOOK:

The Physics of Radiology and Imaging- K. Thayalan (2014)

Course Outcome

C01:	Students will gain knowledge about the different cell organelles of microorganisms and their detailed functions..	
C02:	Students will also study the growth and control of microbes as well as different bacteriological techniques involved in microbiology.	
C03:	Students will learn about the biomolecules by studying their structures and types..	

Mapping of Program Outcomes with course outcomes

CO	P01	P02	P03	P04	P05	PS01	PS02	PS03
C01	✓	✓	✓			✓	✓	
C02	✓	✓	✓			✓	✓	
C03	✓		✓			✓	✓	
C04								
C05								
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	✓
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓	✓	✓

		L	T	P	Credits
	Health and Basic Principles	2	-	-	2

COURSE OBJECTIVES:

Provide compassionate care to patients while respecting their privacy and dignity.

Display honesty, integrity and responsibility in all educational setting and in interactions with patients, their families & colleagues.

Explain the basic principles of bioethics and how to balance these principles in practice.

Concept of Health Care and Health Policy

- Health in Medical Care
 - To acquire ability to speak effectively in real life situations.
 - To write letters and reports effectively in formal and business situations.
 - To develop listening skills for academic and professional purposes.
 - To gain effective speaking and listening skills in communication.
 - To develop the soft skills and interpersonal skills to excel in their career.
 - To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment procedures.

Health Organization

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

Health Policy and National Health Programme

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

Health Economics Fundamentals of Economics

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

Methods & Techniques of Economic Evaluation of Health Program

- Cost Benefit & Cost Effective Methods

Household & Health

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

Economics of Health

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

Health Insurance

Course Outcome

CO1:	Describe the health systems of various Countries including India	
CO2:	Discuss and learn public health care system in India	
CO3:	Develop, implement and manage various public health programs	
CO4:	Critically analyze the various components of health care delivery system in India	
CO5:	Apply various principles of planning and management in implementing health projects and programmes.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓		✓			✓		
CO2	✓	✓	✓			✓	✓	
CO3	✓	✓	✓				✓	
CO4	✓	✓	✓				✓	
CO5							✓	
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

	Biostatistics and Research Methodology	L	T	P	Credits
		2	-	-	2

COURSE OBJECTIVES:

Discuss the process of health sciences research.

Differentiate various study designs.

Discuss validity. Discuss descriptive and inferential statistics.

- **What is statistics** – Importance of statistics in behavioural sciences – Descriptive statistics and inferential statistics – Usefulness of quantification in behavioural sciences.
- **Measurements** – Scales of measurements – Nominal, Ordinal, Interval and Ratio scales.
- **Data collection** – Classification of data – Class intervals – Continuous and discrete measurements – Drawing frequency polygon – types of frequency polygon – Histogram.
- **Cumulative frequency curve** – Ogives – Drawing inference from graph.
- **Measures of central tendency** – Need – types: Mean, Median, Mode – Working out these measures with illustrations.
- **Measures of variability** – Need – Types: Range, Quartile deviation, Average deviation, Standard deviation, Variance – Interpretation.
- **Normal distribution** – General properties of normal distribution – Theory of probability – Illustration of normal distribution – area under the normal probability curve.
- **Variants from the normal distribution** – skewness – Quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.
- **Correlation** – historical contribution – meaning of correlation – types: Product, moment, content correlation, variation of product, movement correlation, rank correlation, Regression analysis. **Tests of significance**- need for – significance of the mean – sampling error – significance of differences between means – interpretation of probability levels – small samples – large samples.

COURSE OUTCOME:

CO1:	A student should be able to recall basic facts about statistics and should be able to display knowledge of conventions such as notations, terminology.	
CO2:	A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.	
CO3:	Student is equipped with statistical modeling ability, problem solving skills, creative talent and power of communication necessary for various kinds of employment.	
CO4:	Student should be able to apply their skills and knowledge that is translate information presented verbally into statistical form, select and use appropriate statistical formulae or techniques in order to process the information and draw the relevant conclusion.	

Mapping of Program Outcomes with course outcomes

CO	PO1	PO2	PO3	PO4	PO5	PS01	PS02	PS03
CO1	✓						✓	
CO2	✓	✓	✓				✓	✓
CO3	✓	✓	✓					✓
CO4		✓						
CO5								
AVERAGE								

Assessment Method

IA1	IA2	MODEL	SEMESTER
✓	✓	✓	
ASSIGNMENT	QUIZ	PROJECTS	SEMINARS
✓	✓		✓

