

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

B.Sc CARDIAC CARE TECHNOLOGY

Curriculum and Syllabus 2023

Regulations
(Based on Choice Based Credit System (CBCS)
&
Outcome Based Education (OBE)
Effective from the Academic year 2023-2024

School of Allied Health Sciences

Vels Institute of Science, Technology and Advanced Studies (VISTAS)

School of Allied Health Sciences

Manjankaranai, Thiruvallur Dist.



SPECIFIC REGULATIONS FOR B.Sc CARDIAC CARE TECHNOLOGY PROGRAMME-2023

1. SHORT TITLE ANDCOMMENCEMENT:

These regulations shall be called "Specific Regulations for the B.Sc. Cardiac care Technology Program of Vels Institute of Science Technology and Advanced Studies, Deemed to be University u/s3 of UGC act 1956.These Regulations are applicable to the students who are admitted to the B.Sc. Cardiac care Technology in this University.

As per the decision of the Academic Council of this University, these regulations have been prepared by adopting the regulations of the VISTAS.

2. AIMS

The aim of the undergraduate Cardiac care technology is to:

To provide holistic knowledge about clinical care, communication, membership of a multidisciplinary health care team, which is committed to professional excellence, social accountability, leadership quality about lifelong learning.

3. OBJECTIVES

On completion of the four years B.Sc. Cardiac care Technology course the graduates will be able to:

- Evolve into a full trained, qualified cardiovascular technologist capable of working independently.
- Become well-versed in techniques such as cardiac catheterization, Electrocardiography, Echocardiography and ultrasound instrumentation.
- Integrate knowledge and skills of cardiovascular technology to provide healthcare solutions for the benefit of the society.
- Become well-prepared for working in a team associated with assisting cardiac surgeons and cardiologists in a high-pressure hospital environments.
- Be cognizant and responsive to the cardiovascular care of the community and possess a commitment to continuously improve knowledge and abilities.

- Demonstrate leadership qualities and entrepreneur skills by working and communicating effectively in interdisciplinary environment, either independently or in a team.

4. ELIGIBILITY FORADMISSION

The minimum age for admission shall be 17 years on or before 31st December of the year in which admission is sought.

A Candidate desiring to join the B.Sc. Cardiac Care Technology course should have passed the HSC/CBSE/ISC or other equivalent examination with one of the following subject combinations:

Physics, Chemistry, Biology & Mathematics

Physics, Chemistry, Botany & Zoology.

A candidate is required to obtain 50% in the Entrance exam conducted by the VISTAS

5. DURATION OF THE COURSE:

The duration of the B.Sc. Cardiac care Technology Degree course shall be 4Yearsfull-time programme comprising 8 Semesters including internship (Three Year Curriculum + OneYearInternship) under Choice based Credit System.

6. MEDIUM OF INSTRUCTION:

English shall be the medium of instruction for all subjects of study and examinations will be conducted only in English.

7. COMMENCEMENT OF THE COURSE:

The course shall commence from August of the academic year.

8. WORKING DAYS IN A SEMESTER:

Each semester shall consist of not less than 100 working days and each academic year shall have a total of 200 working days

9. REGISTRATION

A Candidate admitted to the course shall be registered by remitting the prescribed fees along with the Application form for registration duly filled within the stipulated dates.

10. COMMENCEMENT OF THE EXAMINATIONS:

Regular Semester Examinations will commence from last week of November and last week of April.

If the date of commencement of the examination falls on Saturday, Sunday or declared Public Holidays, the examination shall begin on the next working day.

11. COURSE INSTRUCTION & SCHEME OF EXAMINATION

FIRST SEMESTER

Sl.No.	Category	Course Titles	Hours/Credits							Maximum Marks				
			Lecture		Tutorial		Practical		Total	IA		UA		Total
			Hours	Credits	Hours	Credits	Hours	Credits	Credits	Theory	Practical	Theory	Practical	
1.1	Program Core	General Anatomy	45	3	30	1	60	2	6	25	50	75	50	200
1.2	Program Core	General Physiology	45	3	30	1	60	2	6	25	50	75	50	200
1.3	Program Core	General Biochemistry	45	3	30	1	60	2	6	25	50	75	50	200
1.4	Program Elective	Medical Law & Ethics*	30	2	-	-	-	-	2	100	-		-	100
1.5	Program Elective	English & Communicative Skills*	30	2	-	-	-	-	2	100	-		-	100
								Total	22	Total				800

SECOND SEMESTER

Sl.No.	Category	Course Titles	Hours/Credits							Maximum Marks				
			Lecture		Tutorial		Practical		Total Credits	IA		UA		Total
			Hours	Credits	Hours	Credits	Hours	Credits		Theory	Practical	Theory	Practical	
2.1	Program Core	General Pathology	45	3	30	1	60	2	6	25	50	75	50	200
2.2	Program Core	General Microbiology	45	3	30	1	60	2	6	25	50	75	50	200
2.3	Program Core	General Pharmacology	45	3	30	1	60	2	6	25	50	75	50	200
2.4	Program Elective	Medical Terminology & Record Keeping*	30	2	-	-	-	-	2	100	-		-	100
2.5	Program Elective	Basic Computers & Information Science*	30	2	-	-	-	-	2	100	-		-	100
							Total		**22**	**Total**				**800**

SEMESTER 3

Sl. No.	Category	Course Titles	Hours/Credits							Maximum Marks				
			Lecture		Tutorial		Practical		Total Credits	IA		UA		Total
			Hours	Credits	Hours	Credits	Hours	Credits		Theory	Practical	Theory	Practical	
3.1	Program Core	Applied Pathology	45	3	30	1	60	2	6	25	50	75	50	200
3.2	Program Core	Medicine Relevant to CCT	45	3	30	1	60	2	6	25	50	75	50	200
3.3	Program Core	Intro to CCT-I	45	2	30	1	60	2	6	25	50	75	50	200
3.4	Program Elective	Psychology	30	2	-	-			2	100		-	-	100
Total									**20**	**Total**				**700**

SEMESTER 4

Sl.No.	Category	Course Titles	Hours/Credits							Maxium Marks				
			Lecture		Tutorial		Practical		Total Credits					Total
			Hours	Credits	Hours	Credits	Hours	Credits		Theory	Practical	Theory	Practical	
4.1	Program Core	Intro to CCT – II	45	3	30	1	90	3	7	25	50	75	50	200
4.2	Program Core	Patient care and Basic Nursing	45	3	30	1	-	-	4	25		75	-	100
4.3	Program Core	Basic Intensive Care	45	3	30	1	90	3	7	25	50	75	50	200
4.4	Program Elective	Basic and Advance life support*	30	2	-	-	-	-	2	100	-	-	-	100
Total									**20**	**Total**				**600**

SEMESTER 5

Sl.No.	Category	Course Titles	Hours/Credits							Maximum Marks				
			Lecture		Tutorial		Practical		Total Credits	IA		UA		Total
			Hours	Credits	Hours	Credits	Hours	Credits		Theory	Practical	Theory	Practical	
5.1	Program Core	Interpretation of Echocardiography	45	3	30	1	60	2	6	25	50	75	50	200
5.2	Program Core	Cardiac Evalution & Theories I	45	3	30	1	60	2	6	25	50	75	50	200
5.3	Program Core	Advanced Electrography	45	3	30	1	60	2	6	25	50	75	50	200
5.4	Program Elective	CSSD including Sterilization *	30	2	-	-	-	--	2	100	-	-	-	100
Total									**20**	**Total**				**700**

SEMESTER 6

Sl.No.	Category	Course Titles	Hours/Credits							Maximum Marks				
			Lecture		Tutorial		Practical		Total Credits	IA				Total
			Hours	Credits	Hours	Credits	Hours	Credits		Theory	Practical	Theory	Practical	
6.1	Program Core	Cardiac Evalution &Theories II	60	4	30	1	120	4	9	25	50	75	50	200
6.2	Program Core	Cardiac catherization laboratory basic &advanced	60	4	30	1	120	4	9	25	50	75	50-	200
6.3	Program Elective	Bio Medical Statistics &Research Methodology	30	2	-	-	-	-	2	100		-	-	100
Total									**20**	**Total**				**500**

SEMESTER 7 & 8

Sl.No.	Category	Course Titles	Hours/Credits				Maximum Marks				Total
							IA		UA		
			Theory	Tutorial	Practical	Total	Theory	Practical	Theory	Practical /Viva	
7.1	Project	Project	-	2	-	2	-	100	-	-	100
7.2	Internship	Internship	-	38	-	38	-	100	-	-	100
Total						**40**	**Total**				**200**

*Indicate the maximum CIA is 100 marks & Minimum 50 marks (no university exam)

11. SUBMISSION OF LABORATORY RECORD NOTE BOOKS:

At the time of practical examination, each candidate shall submit to the examiners his / her laboratory note books duly certified by the Head of the Department as a bonafide record of the work done by the candidate.

12. INTERNAL ASSESSMENT:

a) A minimum of two written internal assessment examinations shall be conducted in each subject during a semester and the Best / Average marks of two examinations shall be taken into consideration for the award of internal marks.

b) A model practical examinations shall be conducted in each subject (wherever practical have been included in the curriculum) shall be taken into consideration for award of internal marks in practical.

c) Tests will be conducted giving sufficient time for preparation.

d) No repeat, reschedule and postponement of the assessment date is permitted. Students shall compulsorily attend any two continuous assessments

13. ATTENDANCE REQUIRED FOR ADMISSION TO EXAMINATIONS:

(a) No candidate shall be permitted to appear for the University examinations, unless he/she attends the course for the prescribed period.

(b) Every candidate is required to put in a minimum of 80% of attendance both in theory and practical separately in each subject for admission to the examination.

(c) A candidate lacking in the prescribed attendance in any subject in theory and/or practical shall not be admitted to the entire examination.

14. CONDONING LACK OF ATTENDANCE:

1. Condoning of shortage of attendance up to a maximum of 10% in the prescribed eligible attendance for admission to year end examination rests with the discretionary power of the Vice Chancellor. A Candidate lacking in attendance should submit an application in the prescribed form and remit the stipulated fee, 15days prior to the commencement of the theory examination, The Head of the Department should satisfy himself on the reasonableness of the candidate's request while forwarding the application of the candidate to the Controller of Examinations, who would obtain the Vice–Chancellor's approval for admission to the examination. No application would be accepted if it is not forwarded through proper channel.

2. Condoning lack of attendance should be taken up for consideration under the following circumstances:-

a) Any illness affecting the candidate Candidates should submit a medical certificate from registered medical practitioners.

b) Any unforeseen tragedy in the family.The parents/guardian should give in writing about what had happened.

c).Participation in National Service Scheme and other co-curricular activities representing the University.

15. RE-ADMISSION AFTER BREAK OF STUDY:

A separate regulation is available for all the UG/PG courses of this university for the readmission of candidates after a break of study.

16. INTERNSHIP:

1. Internship means 8 hours of integrated clinical duties.
2. Internship should be carried out as 8 Hours per day @ 48 hours per week
3. Students will be supervised by the Faculties & well Trained Professionals during Internship.
4. Internship will be started after passing in the third year Examination.

17. YEAR END EXAMINATIONS:

1. Commencement of the Examination will be in November /April
2. If the date of commencement falls on Saturdays, Sundays or declared public holidays, the examination shall begin on the next working day.
3. The duration of the examination of each subject is 3hours.

Carryover of failed subjects.
A candidate has to pass in theory and practical examinations separately in each of the subject.

If a candidate fails in either theory or practical of the subjects, he/she has to reappear for both the Theory and Practical.

The candidate if fails can be permitted for admission to next year.

The candidate shall have to clear all the previous examination before appearing for the Sixth Semester examination.

18. REVALUATION/RETOTALLING OF ANSWER PAPERS:

There is provision for revaluation of the answer papers of failed candidates in any examination. However, the failed candidates cannot apply for retotalling.

19. CREDITS:

Credits will be assigned on the basis of the lectures (L) /tutorials (T) Clinical Training (CR) /laboratory work (P) /Research Project (RP) and other form of learning in a 15-20 week schedule.

- L- One credit for one hour lecture per week (1 credit = 15 hours)
- P/T – One credit for every two hours of laboratory or practical (1 credit = 30 hours)
- CR – One credit for every two hours of Clinical Training/Clinical Rotation/Posing (1 credit = 30 hours)
- RP – One credit for every two hours of Research Project per week – Max Credit 20-25 (1 credit =30 hours)

20. GRADING SYSTEM:

Based on the performance, each student shall be awarded a final grade at the end of the semester for each course. Absolute grading is used by converting the marks to grade, based on pre-determined class intervals.
UGC 10-point grading system is used with pass grade modified.

Letter Grade	Grade Point	Range of Marks*
O (Outstanding)	10	85% & above
A+ (Excellent)	9	80-84.99%
A (Very Good)	8	75-79.99%
B+ (Good)	7	65-74.99%
B (Above Average)	6	60-64.99%
C (Average)	5	50-59.99%
P(Pass)	-	>50%
F (Fail) / RA (Reappear)	0	<50%
AB (Absent)	0	0

A candidate is declared to have pass in a course if he /she secures a minimum 50% marks the university theory & practical Examinations separately & 50% in aggregate of university theory/practical & internal assessment put together

Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

SPGA is the weighted average of the grade points obtained in all courses by the student during the semester

SGPA Computation:

$$SGPA = \frac{\sum_i^n (C_i \times (GP)_i}{\sum^n C_i}$$

Where C_i - credits for the course, $(GP)_i$ - the grade point obtained for the i^{th} course , n – total number of courses and the sum is over all the courses taken in that semester, including those in which the students has secured "F" and "Ab" grades.

CGPA Computation:

Computation of CGPA:

CGPA is calculated with SGPA of all semesters to two decimal points and is indicated in final grade in mark card/transcript showing grades of all 8 semesters and their courses/subjects.

$$CGPA = \frac{\sum_i^r \mathbf{S_i} \times (SGPA)_i}{\sum_i^r S_i}$$

where:-S_i- sum of credits in i^{th} semester , $(SGPA)_i$- semester grade point average earned in i^{th} semester and r- number of semester and the sum is over all the semesters under consideration. The cumulative grade point average (CGPA) is calculated by consideration all the courses taken from the first semester onwards for regular students and from third semester onwards taken for lateral entry students.

21. CLASSIFICATION OF SUCCESSFUL CANDIDATES

The CGPA arrived at the completion of the course shall be the criteria for the classification of successful candidates as below:

Cumulative Grades and GradePoints

Letter Grade	Grade Point	Range of Marks*
O (Outstanding)	10	86-100
A+ (Excellent)	9	70-85
A (Very Good)	8	60-69
B+ (Good)	7	55-59
B (Above Average)	6	50-54
C (Average)	5	45-49
D – (Pass)	4	40-44
F (Fail) / RA (Reappear)	0	Below 40
AB (Absent)	0	-
NC- not completed	0	-

a) Successful candidates who secure 75% marks and above as a course aggregate in the first appearance taking University theory, practical, project / dissertation evaluation and viva shall alone be awarded Distinction. This will also apply for award of University rank.

b) Successful candidates who secure 60% marks and above as a course aggregate in the University theory, practical, project/dissertation evaluation and viva shall be awarded First Class.

c) All others who secure 50-59% in gross percentage will be classified to have passed in Second Class.

22. PATTERN OF QUESTION PAPER FOR UNIVERSITY EXAMINATON:

EXAMINATION QUESTION PAPER PATTERN

Essay	**2 x 15**	**=30 Marks**
Short Notes	**7 x 5**	**=35Marks**
ShortAnswers	**5 x 2**	**=10 Marks**
Total		**75 Marks**

Internal Split up – Theory

1. Continuous Assessment: 10 Marks

S.no	Continuous Assessment	Marks
1	Attendance	5
2	Assignment	5

2. Internal Assessment: 15

marks Two Sessional Exams

per Course **Internal Split up –**

Practical

1. Continuous Assessment: 20 Marks

S.no	Continuous Assessment	Marks
1	Seminar	10
2	Record note Book	10

2. Model Practical Examination: 30 Marks

23. GRACE MARKS

Maximum of 8 grace marks for each subject is permitted, and grace marks should not exceed 8 marks in each subjects.

24. MARKS QUALIFING FOR PASS

A candidate is declared to have passed in a course if he/she secures a minimum of 50% marks in university theory and practical examinations separately and 50% in aggregate of University theory /practical and internal assessment put together.

B.Sc.CARDIAC CARE TECHNOLOGY

GENERALANATOMY

Course description:

A study of the anatomical structure of the human body

.• Bodystructure will be studied byorgan systems.

• Form-function relationships with emphasison clinically relevant anatomy.

• The laboratory studywill involve observing and learning from human skeletal collections and dissected cadavers and

•Preserved specimens.

Objectives:

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

• Describe the structure and functions of the organ systems of the human body. • Describe how the organ systems function and interrelate.

• Learn basic technical terminology and language associated with anatomy. • Develop a self-identityof what it means to be "human".

Learning Objectives: Skills

• Identify the anatomical structure in the dissected specimen.

• Learn to correlate anatomical structures with relevant clinical conditions.

Unit I:

Organization of the Human Body Introduction to the human body - Definition and sub divisions 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 oftissues.

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, gastronemius and diaphragm.

Unit III:

Control Systems of the Body

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

2. Sense organs Location and features ofthe 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 byeach 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 oforgans of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

Unit V:

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 salivaryglands, pancreas, liver and gall bladder.

2. Urinary system Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra.

Unit VI:

1. Reproductive system Names of male and female organs of reproduction. Location and featuresof 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. Demonstration ofdissected specimens.

Recommended books:

1. Ross and Wilson: Anatomyand Physiology in health and illness
2. B D Chaurasia: General human anatomy

GENERAL PHYSIOLOGY

Objectives of the course:

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

Comprehend basic terminologies used in the field of Human Physiology

- Define and describe basic Physiological Processes governing the normal functioning of the human body
- Apply this knowledge in their Allied Health Science practice

UNIT I

Ia. GENERAL PHYSIOLOGY Concept of Homeostasis - Cell structure and functions - Transport across membranes

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

Ic. BLOOD AND BODY FLUIDS Body fluid volumes, compartments, and composition - Blood composition and functions - Plasma proteins – Erythrocytes – Morphology and functions , Leucocytes – Morphology and functions, Platelets-Morphology and functions Blood groups.

UNIT II

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

IIb.SKIN Structure of sweat glands; temperature regulation

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

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

IIIb. REPRODUCTION: 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 – Coronaryand Cerebral

UNIT VI

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

VI b.SPECIAL SENSES 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

GENERAL BIOCHEMISTRY

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 Hemoglobins, 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, hyper cholesterolemia

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

Minerals: Calcium, Phosphorus, Iron, iodine. Outline ofPH homeostasis

Practical

1. Benedict's reagent
2. Barfoeds reagent
3. Foulgers reagent
4. Seliwanoff reagent
5. Fouchets reagent

Text books Recommended:

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

MEDICAL LAW AND ETHICS

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, analysing, 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 ofthe 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. Autonomyand informed consent

7. Right ofpatients

8. Care ofthe terminally ill and Euthanasia

9. Organtransplantation

10. Sentinel events

RECOMMENDED BOOKS

- Medicalethics by C.M. Francis

COMMUNICATION AND SOFT SKILLS

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 formand organization.

4. Basic concepts & principles ofgood communication

5. Special characteristics ofhealth communication

6. Types & process ofcommunication

7. Barriers ofcommunication & how to overcome

SEMESTER -II

PATHOLOGY

Learning Objectives

This module aims at providing an understanding of basic concepts of pathology including process of inflammation and features of various systemic diseases.

Unit I:

Introduction Concept of diseases, classification of lesions - Inflammation and repair - Cellular adaption, Cell injury, necrosis and gangrene

Haemodynamic disorders including haemorrhage, shock, embolism and thrombosis.

Unit II:

Infections Tuberculosis - Leprosyand Typhoid.

Unit III:

Deficiency diseases Anaemias

Unit IV:

Tumour 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 ofuterus, cervix, ovaries and testis.

Learning Outcomes:

At the end ofthe module, the student must be able to

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

Recommended Textbook:

Textbook of Pathology, Harsh Mohan, 3rd edition

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 ofLung
3. Lipoma
4. Squamous cell Carcinoma ofFoot
5. Infective Endocarditis
6. Left Ventricular Hypertrophy
7. Osteoclastoma
8. Osteogenic Sarcoma
9. Osteomyelitis
10. Chronic Pyelonephritis-Kidney

Unit II: Haematology Instruments:

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

Recommended reading: Harsh Mohan- Practical Pathology

MICROBIOLOGY

Objective:

At the end ofthe 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

Historyand introduction to microbiology, studythe morphology of bacterial cell and theirfunctions.

Unit II

Basic concepts about infection, (Source, portal of entry & spread) immunity, biomedical waste management and standard precautions

Unit III

Sterilization and disinfection procedures and their application.

Unit IV

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

a. ProfC P Baveja - Text book of Microbiology.
b. 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) Gram stained smears showing Candida

g) Culture growthof 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) Clostridial 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

PHARMACOLOGY

Course Objectives:

1. To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic 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 andDrugsacting on Central Nervous system

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

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

Antiepileptic's-Antiparkinsonian drugs-Drugs used in mental illness-Opioid analgesics and Non opioid Analgesics

Nonsteroidal Anti-inflammatory drugs

UNIT 3: Cardiovasculardrugs, Drugs affecting Blood & Blood formation and Drugs onRespiratory system

Cardiac glycosides, Antiarrhythmic drugs, Antianginal drugs, Antihypertensives and Diuretics, Haematinics, Erythropoietin,,Drugs affecting-coagulation,Fibrinolytic and Antiplatelet drugs,Treatment of cough and antiasthma tic drugs

UNIT 4: Antimicrobial drugs

General consideration-Antibiotics-Antibacterial agents-Ant tubercular drugs-Antifungal-Antileprotic-Antiviral-AntimalarialAntiamoebic-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 DiSabetes Mellitus,Treatment of Vomiting,Constipation,Diarrhoea and Treatment of peptic ulcer Vitamins,Vaccines,Sera and chelating agents.

Recommended books:

i. Prep Manual for Undergraduates in Pharmacology by Tara V Shanbag, 2nd edition

i. Pharmacology for Dental and Allied Health Sciences by PadmajaUdaykumar, 3rd edition

Pharmacology Lab

Learning Objective

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

Instruments:

Needles Intravenous, Intrathecal , Spinal, Intra arterial

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

Students Discussion Enema can, Inhalers, Spacers, 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 ofpharmacology for Dental &Allied Health Science 2rd edition PadmajaUdaykumar
2. Pharmacology for dentalstudents Tara V Shanbhag, SmitaShenoy, VeenaNayak
3. Principles of pharmacology 2rd edition H.L.Sharma& KK Sharma

MEDICAL TERMINOLOGIES AND RECORD KEEPING

This course introduces the elements of medical terminology. Emphasis is placed onbuilding 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 reports,and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests. Topics to be covered under the subject are as follows:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation ofplurals
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.

BASIC COMPUTERS AND INFORMATION SCIENCE

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 Power Point presentation.Topics to be covered under the subject areas follows:

1. Introduction to computer:Introduction, characteristics of computer, block diagram ofcomputer,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:TheCentralProcessingUnit(CPU),main memory.

4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk,optical disk,masss 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,minimizingand 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 of table,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 manipulatingpresentation,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.

APPLIED PATHOLOGY

I. CARDIOVASCULAR SYSTEM

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms – Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy – causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types ofIHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy – Definition, Types, causes and significance.
- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases – Basic defect and effects of important types of congenital heart diseases.

II. RESPIRATORY SYSTEM

- Chronic obstructive airway diseases – Definition and types. Briefly causes, Pathology and complications of each type of COPD.
- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion – causes, effects and diagnosis.

III. RENAL SYSTEM

- Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease – Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

PRACTICALS

1. Description & diagnosis of the following gross specimens.
    a. Atherosclerosis.
    b. Aortic aneurysm.
    c. Myocardial infraction.
    d. Emphysema
    e. Chronic glomerulonephritis.
    f. Chronic pyelonephritis.
    g. Urine Chart - ARF, CRF, Acute glomerulonephritis.

Reference Books

1. Text Book Of Essential Pathology – Harsh Mohan. Seventh Edition
2. Text Book Of Basic Pathology – Robbins.

MEDICINE RELEVANT TO CARDIAC CARE TECHNOLOGY

AT THE END OF THE COURSE THE STUDENTS WILL BE ABLE TO:

1 . To assess common medical and behavioral diseases and conditions through the application and integration of core medical knowledge (etiology, risk factors, pathophysiology, prevalence, clinical presentation, diagnostic evaluation and interpretation) and the use of evidence based decision making toward the diagnosis, management and treatment of patients encountered in the primary care setting.

2. Recognize and approach the evaluation and initial management of acute illness and teach the approach to the management of chronic illnesses that are commonly seen in the hospital setting.

3. Elicit a focused history and perform a focused physical examination.

4. Recognize and/or provide evidence-based health promotion and disease prevention guidance as well as patient education and counseling.

OBJECTIVES

Cardiovascular System

- Ischaemic heart diseases

  Rheumatic heart disease
- Congenital heart disease
- Hypertension
- Aortic Aneurysms
- Cardiomyopathy
- Peripheral vascular disease
- Pulmonary edema and LV failure

Hematology

- Anaemia
- Bleeding disorders
- Laboratory tests used to diagnose bleeding disorders (in brief)

Respiratory System

- Chronic obstructive airway diseases (COPD)
- Concept of obstructive versus restrictive pulmonary disease
- PFT and its interpretation

Renal System

- ARF & CRF
- End stage renal disease
- Role of dialysis and renal transplantation in its management

CNS

- Automatic nervous system
- (Sympathetic & Parasympathetic system)
- Brief mention of CNS disorders & their etiology

Others

- DM
- Obesity
- Pregnancy

- Paediatric Patient (neonate/Infant)
- Elderly patient

PRACTICALS

- Viva vocals can be conducted.
- Include as practical examination with the above syllabus topics

INTRO TO CARDIAC CARE TECHNOLOGY PAPER(I)

OBJECTIVES

- The syllabus is designed to provide the students an understanding the Basic Cardiac techniques and applied Anatomy, Physiology of the Cardiovascular systems at the introductory level.
- At the end of the semester students are able to learn practical skills like, ECG, TMT, various Cardiac equipment devices.

Unit I

Applied Anatomy and Physiology

a) Structure of the heart and gross anatomy, normal position situs solitus, situs inverses with dextrocardia, situs solitus with dextrocardia, situs inversus with levocardia.
b) Systemic and pulmonary circulation, coronary structure, coronary sinus structure and circulation.
c) Chest topography - identification of imaginary lines, topographical landmarks over thorax, topography of heart and lungs.
d) Surface marking of heart, aorta, pulmonary artery, pericardium, heart valves, subclavian .
e) Vasovagal attack, Layers of heart, Renin angiotensin system.
f) Blood circulation, cardiac output, pulmonary circulation, pulmonary edema
g) Concepts of myocardial infraction.
h) Conduction system of the heart.
i) Fetal circulation.

Unit II

Non-invasive ECG and TMT

ECG

a) Technique of ECG recording , Standardization its types, paper speed , other components of ECG paper.
b) ECG Leads system with it's Orientation and representation.
c) ECG waves – PQRSTU (how it is formed), Osborn wave, delta wave, epsilon wave.
d) ECG rates, rhythm, axis of heart , lead positioning (for all the types of lead system).
e)Einthoven's Tangle
f) Intervals and segments - PR interval, PR segment, ST segment, QT interval, J point and QRS complex.(normal and abnormal duration – what happens during abnormal duration)
g) Difference between Heart Rate and Rhythm How to calculate it in a ECG paper.
h) How is electrical conduction is inter-related to ECG.
I) Things to be noted in an ECG paper.
J) ST segment displacement with its types- MI localization.
K) ECG changes due to cholesterol block or platelet plaque, ischemia and infraction.

TMT

a) Exercise Physiology.
B) Exercise Protocols .explanation of the standard protocols, Indications , Contra- Indications, Absolute Indications and absolute Contra – Indications.
c) Treadmill lead system – Lead placement system, materials required and protocol selection method.
d) Pre-test- Preparation of the patient to the Treadmill test , exercise test indications , conta-indications and

precautions , cardiac arrhythmias and conduction disturbance during test, resting ECG (normal or any changes in ST-Segment).
e) Procedure of TMT- non electrocardiographic observations .
f) Post- Procedure .

Unit III

Non-invasive Echocardiography
a) Introduction and purposes, demonstration of machine parts,
b) Basic Echo windows.
c) Echocardiographic views
d) Imaging modes - two-dimensional (2D) imaging, M-mode imaging and Doppler imaging, colour - flow mapping
e) Introduction to types of Echo.
PRACTICAL

1. History taking

2. Clinical Examination: General Physical Examination and assessment of vital signs

3. Clinical Examination: Basic Systemic Examination

4. Conversion between different units

5. Devices: Sphygmomanometer, thermometer, pulse oximeter.

Reference Books (latest edition)

1. Hutchison's Clinical Methods

2. A text book of Electrocardiography – Goldberger

3. Nanda's A Text book of Echocardiography

4. A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim

5. A Text book of Cardiovascular Medicine. Dr. Bruanwald's.

6. A Text book of Medicine, Davidsons

PSYCHOLOGY

UNIT 1: Basic Concepts of Psychology

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

UNIT 2: Learning principles and methods

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

UNIT 3: Motivation, Emotion, Memory and forgetting

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

UNIT 4: Development, Sensory Processes and Perception.

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

UNIT 5: Intelligence & Personality

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

UNIT 6: Social Psychology

Definition, Nature, Subject Matter and Scope Of Social Psychology-Applications and Importance of Social Psychology, Groups: Definition and Type- Primary And

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

UNIT 6: 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 ofPsychology, University of Madras.
6. Coleman, James. 1980. "Abnormal Psychology and modern life**"**. New Delhi: Tata McGrawHill Ltd.

SEMESTER-4

INTRO TO CARDIAC TECHNOLOGY PAPER(II)

OBJECTIVES

The syllabus is designed to provide the students an understanding the basics of Echocardiography.

Introduction to coronary angiogram

a) History of coronary angiography .
b) Instrumentation in cath Lab.
c) preparation of patient prior to the procedure.
e) post procedure care.
f) Drugs used in emergency during cath lab.
g) Coronary blood circulation (arteries and veins)
h) Anomalies in the origin of coronary areteries.
i) Organization of cath lab services
j) Data management of cath lab

Electrocardiography

a) Electrolyte disturbances and ECG deflections related to it.
b) ECG changes involved in acute myocardial infarction
c) Diagnoses of WPW syndrome
d) ECG changes in left and right atrial enlargement.
e) ECG changes in LVH and RVH , strain pattern, criteria.
f) Changes in PR,QT,R-R interval .
g) Tachycardia,Bradycardia ,irregular interval ECG changes.
h) RBBB,LBBB, Fasicular block, bifasicular block, tri-fasicular block.

Echocardiography

a) Types of transducers with it's significance.
b) Doppler echocardiography ,Regional wall motion abnormality .
c) Evaluation of systolic and diastolic Left ventricular functions.
d) Normal chambers and dimensions
e) Dilated cardiomyopathy
f) Hypertrophic cardiomyopathy.
g) Restrictive cardiomyopathy
h) Pleural effusion
i) IVC collapse- IVC plethora, Hypoplastic IVC
j) Artefacts during echo
k) Echo approach during lung disorder
l) Trans-esophageal echocardiography –views, defects seen,indications,contra-indications bubble contrast .
m) Takotsubo cardiomyopathy.

VALVULAR HEART DISEASE –ECHOCARDIOGRAPHY

a) Aortic Stenosis
b) Mitral Stenosis
c) Pulmonary Stenosis
d) Tricuspid Stenosis
e) Aortic Regurgitation
f) Tricuspid Regurgitation
g) Mitral Regurgitation
h) Pulmonary Regurgitation
i) RHD

Practical/ students presentations

1, Interpretation of ECG

2, Interpretation of Echo

3, **Spotters**-Materials and instruments used in cathlab and explaining them.

Recommended Books Recent Editions

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

PATIENT CARE AND BASIC NURSING

OBJECTIVES

- The syllabus is designed to provide the students an understanding the Basic Nursing care to the patient.
- At the end of the semester students are able to learn practical skills like, Monitoring Pulse, BP, IV injections, Catheterization, Maintenance of records.

Unit I

Introduction, Communication and Documentation -

1. Introduction to Patient Care:

a) Principles of patient care

b) Types of patients (gender, age, diseases, severity of illness, triage)

2. Communication & Documentation: a) Communication with doctors, colleagues and other staffs.

b) Non-verbal communication, Inter-personnel relationships.

c) patient contact techniques, communication with patients and their relatives

3. Documentation:

a. Importance of documentation,

b. initial and follow up notes;

c. documentation of therapy, procedures and communication

Unit II

Universal Precautions and
Infection Control

4. Universal Precautions and Infection Control:

a) Hand washing and hygiene.

b) Injuries and Personal protection, Insulation and safety procedures.

c) Aseptic techniques, sterilization and disinfection.

d) Disinfection and Sterilization of devices and equipment

e) Central sterilization and supply department f) Biomedical Medical waste management

Unit III

Medication Administration and Transport of patient

5. Medication Administration

a) Oral / Parenteral route

b) Parenteral medication administration: Intra venous, intra muscular, subcutaneous, intra dermal routes, Intra venous Infusion

c) Aerosol medication administration, Oxygen therapy

d) Intravenous fluids, e) Blood and blood component transfusion

6. Position and Transport of patient:

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

b) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.

c) Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV

Bedside care and monitoring -

7. Bedside care

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

8. Monitoring of Patient

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

Unit V

Wound care and first aid

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

PRACTICALS

First Aid and Basic Life Support (BLS)

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

Reference Books (latest edition)

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

BASIC INTENSIVE CARE

OBJECTIVES

The syllabus is designed to provide the students an understanding the Basic intensive Care of Cardiac technology.

Unit I

General ICU Care and Monitoring

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

Unit II

Infection Control and Nutrition in ICU

3. Infection control in ICU: prevention of cross infection, personal protection, antibiotics and policy. 4. Nutrition and Fluid balance - total parentral nutrition, nasogastrictube, gastric tube, jejunostomy tube care and feeding, IV Fluids

Unit III

Systemic Diseases and Care in ICU

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

Unit IV

Head Injury and Trauma care in ICU

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

Unit V

Acid base disorders, neonatal ventilation, imaging in ICU - 12 hours

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

PRACTICALS

Include as practical examination with the above syllabus topics

BASIC & ADVANCED LIFE SUPPORT

TRAUMA LIFE & CARDIAC LIFE SUPPORT

UNIT I. TRAUMA LIFE (Part 1)

BLS TRIAGE
Primary Survey
Secondary Survey
Airway & Ventilatory management
Shock
Central & peripheral venous access
Thoraclc trauma – Tension pneumothorax
Other thoracic injuries
Abdominal trauma – Blun injuries
Abdominal trauma – Penetrating injuries

UNIT II. TRAUMA LIFE (Part 2)

Spine and spinal cord trauma
Head trauma
Musculoskeletal trauma
Electrical injuries

Thermal burns
Cold injury

UNIT III. TRAUMA LIFE (Part 3)

Paediatric trauma
Trauma in pregnant women
Workshop BLS
Workshop cervical spine immobilization
Imaging studies in trauma

UNIT IV. CARDIAC LIFE SUPPORT (Part 1)

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

UNIT V. CARDIAC LIFE SUPPORT (Part 2)

Hypotension / Shock
Acute myocardial infarction
Paediatric Advanced life support
Airway management
Defibrillation
Drugs used in ACLS
SEmergency Cardiac pacing
AED
Techniques for oxygenation and ventilation

SEMESTER V

INTERPRETATION OF ECHOCARDIOGRAPHY

OBJECTIVE

Objective: The syllabus is designed to provide the students. To learn about the basics of principles, practice and applications of echocardiography.

Principles of colour Doppler and spectral Doppler and their applications

ECHO views

ECHO windows

Obtaining Left ventricular images

Echocardiographic measurements of all dimensions.

Indications for echocardiography:

Assessment of anatomy Assessment of etiology

Assessment of pathology

Assessment of physiology

Assessment of follow up of cardiac diseases

Technical pit falls of echocardiography-Echo windows

Stress Echocardiography

Bubble contrast

Indication

Contra- Indication

Reporting test.

Trans Oesophageal Echo cardiography

Views

Indication

Contra- Indication

Test report.

Applied pathology Echo findings

a) LV study (Simpsons method)

b) Concentric LVH

c) Eccentric LVH

d) Biventricular Hypertrophy.

e) Patent Ductus Arteriosus

f) Atrial Septal Defect

g) Ventricular Septal Defect

h) Co-arctation of aorta

i) Single ventricular defect

j) Single atrial defect

k) Cor-Triatriatrum

l) Tetralogy of Fallot

m) Pentalogy of Fallot

n) Ebstein'sanomally

o) Trans-position of great arteries

p)Tricuspid atresia

Practical Assessment :

a) Spotters

b) Video Clips

c) Demonstration of common disorder

CARDIAC EVALUTION &THERAPIES I

OBJECTIVES:

Objectives: The syllabus is designed to provide the students. To learn about heart diseases and related disorders. To learn the concepts of cardiovascular - investigations and therapies.

Unit I Clinical disorders of heart - 12hours

a) Clinical presentation, evaluation and management of acute coronary syndromes
b) Clinical presentation, evaluation and management of stable ischemic heart disease
c) Hypertension, diagnosis, complications and management
d) Cardiac arrhythmia, presentation, diagnosis and management
e) Heart failure, classification, diagnosis and management

Unit II Management of complications

a) Management of intra coronary thrombus
b) Management of hypotension
c) Management of vasovagal attack
d) Management of coronary perforation
e) Management of retrieval of dislodged foreign materials in the vessel**s**

Patient monitoring in cardiac care- 12 hours

3. Monitoring of a patient with cardiac disease
a) Cardiac Rhythm and rate.
b) Trans-cutaneous oxygen monitors and Pulse oximeters.
c) Invasive hemodynamic monitoring
d) Multi parameter monitoring
e) ACT monitoring
f) Monitoring response to therapy and progression of disease

Unit IV

Cardiovascular investigations: Non invasive

a) ECG - Review of ECG patterns in ischaemic heart diseases, hypertensive heart disease.
b) Echocardiography - A review of Evaluation of valvular heart diseases, ischaemic heart diseases, Cardiomyopathies and pericardial diseases
c) Pulmonary hypertension, infective endocarditis, intracardiac masses.
d) Stress test- treadmill test review, pharmacological stress testing.
e) 24 hours Holter monitoring

Unit V

Cardiovascular investigations: Invasive and non-invasive

a) Coronary angiography
b) Diagnosis of mitral stenosis, regurgitation and mixed ,flail mitral valve
c) Diagnosis of shunts A review d) Diagnosis of peripheral and aortic diseases
e) Complications of cardiac catheterization
f) Contrast induced nephropathy prevention and management

Practical / Students Presentations

1. Diagnostic patterns of ECG change s in a patient with chest pain.
2. Diagnostic patterns of ECG changes during stress test
3. Evaluation of rheumatic mitral stenosis by echocardiography
4. Evaluation of Pericardial effusion by echocardiography

Recommended Books Recent Editions.

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

ADVANCED ELECTROCARDIOGRAPHY (ECG)

OBJECTIVES:

The syllabus is designed to provide the students to learn the Advanced electrocardiography.

- The abnormal electrocardiogram
- Intraventricular conduction delays
- Myocardial ischemia and infarction
- Repolarization (ST-Twave) abnormalities
- QRS changes
- Evolution of electrocardiographic changes
- Localization of ischemia or infarction
- Non-infarction Q waves
- Primary and seconday T wave change
- Electrolyte and metabolic ECG abnormalities
- Cardiac arrhythmias
- Ventricular premature beats
- Supra-ventricular tachycardia
- Atrial flutter/fibrillation
- Ventricular Tachycardia/Ventricular fibrillation
- Atrio Ventricular block
- Prolonged PR interval
- Mobitz type 1 and 2 block
- Complete heart block
- Direct Current (DC) shock
- Defibrillator
- Monophasic and biphasic shock
- Technique of cardioversion
- Indications for cardioversion
- Pulseless electrical activity
- Torsades de pointes
- Brugada syndrome
- Atrial and ventricular extra-systole(pre-excitation syndrome)
- Posterior MI
- Emphysema
- pericarditis

Textbook recommended: Introduction to Electrocardiography-Schamroth

CSSD INCLUDING STERILISATION

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 ofsurgical 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 ofsterilization of carbonized articles).Methods of disinfection, Boiling, Chemical disinfection, Hazards of sterilization.

UNIT: V Prevention ofhazards ofsterilization. Precautionsto be taken during Sterilization. Recent advances in the methods of sterilization – plasma and ozone sterilization. Sterilizer validation.

Reference Textbook:

1. Hospitalsterilization. PremAnand 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 sterilize

SEMESTER-VI

CARDIAC EVALUTION &THERAPIES II

OBJECTIVES:

Objective: The syllabus is designed to provide the students to learn about optimum use of noninvasive and invasive cardiology techniques

Unit I Electrocardiography

a) PR interval
b) QT interval
c) Calculation of heart rate
d) Analysis of ST segment
e) Artefacts in tread mill ECG
F) Report writing in Holter monitoring.

Unit II Echocardiography

a) Basics of pediatric echocardiography
b) Echocardiography in acute rheumatic fever
c) Echocardiography in chronic rheumatic heart disease
d) Echocardiography in cardiac tamponade
e) cardiac pacing
f) S/P ASD, VSD closure review echo.

Unit III Invasive techniques

a) Cardiac pacing indications
b) Cardiac anatomy and its importance in pacing
c) Cardiac pacing physiology

d) Cardiac pacing temporary
e) Cardiac pacing permanent
f) Programming of pacemakers
g) Common problems associated with pacemakers.
h) External cardiac pacing

Unit IV

Important Medical conditions and their relevance to cardiac care

a) Anemia
b) Renal failure
c) Bleeding Diathesis
d) Heart failure
e) Hypoxia (cyanosis)

Practical/ students presentations

1. Pacemaker interrogation
2. Demonstration of estimation of severe mitral stenosis by echocardiography

Recommended Books Recent Editions.

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

CARDIAC CATHETERIZATION LABORATORY BASIC &ADVANCED

OBJECTIVES:

The syllabus is designed to provide the students to learn about Cardiac catheterization Laboratory techniques

UNIT-I

- Type of catheters
- Catheter cleaning and packing
- Techniques of sterilization-advantages and disadvantages of each Setting up the cardiac catheterization laboratory for a diagnostic study
- Table movement
- Image intensifier, Image play back
- Intra cardiac pressures

  Pressure recording systems

  Fluid filled catheters versus catheter tipped manometers
- Artifacts, damping, ventricularization
- Pressure gradient recording – pullback, peak – to peak

UNIT-II

- Cardiac output determination

  Thermo dilution method

  Oxygen dilution method
- Principles of oximetry
- Shunt detection and calculations.
- Coronary angiography
- Coronary angiographic catheters

- Use of the manifold
- Angiographic views in coronary angiography

UNIT-III

- Laboratory preparation for coronary angiography
- Left Ventriculography – catheters, views, use of the injector
- Right heart catheterization and angiography
- Aortic angiography – aortic root, arch, abdominal aorta
- Peripheral angiography and carbondioxide angiography
- Catheterization and angiography in children with congenital heart disease

UNIT-IV

- Contrast agents
- Ionic and non-ionic
- Types of non-ionic agents
- Contrast nephropathy
- Measures to reduce incidence of contrast neophropathy
- Coronary angioplasty (PTCA)
- Equipmentsused in PTCA:
- Guiding catheters
- Guidewires
- Balloons
- Stents
- Setting up the laboratory for a PTCA case

UNIT-V

Management of complications:

- Slow flow/no flow
- Acute stent thrombosis
- Dissection
- Perforation
- Pediatric Interventions
    - Aortic and pulmonary valvuloplasty
    - Coarcation angioplasty and stenting
- Device closure of PDA,ASD,VSD

  Technique and devices used

  Sizing of devices

  Coil. closure of PDAs
- Balloon Mitral valvuloplasty (BMV)
- Techniques and hardware used in BMV
- Setting up the laboratory for a BMV case
- Technique and equipment used for trans-septal puncture

- Recording of transmitral pressure gradients
- Management of cardiac tamponade
- Peripheral interventions

UNIT-VI

- Equipment and techniques used
- Endovascular exclusion of aneurysms
- Self-expanding stents, covered stents and cutting balloons
- Intra-aortic balloon pump (IABP)
- Theory of intra-aortic balloon counter-pulsation
- Indications for IABP use
- Setting up the IABP system
- Thromboembolic disease
- Indications and use of venacaval filters
- Techniques of thrombolysis – drug and catheters used
- Thrombus aspirations systems – coronary, peripheral
- Thrombus aspirations systems – coronary, peripheral

UNIT-VII

- Cardiac pacing
- Temporary pacing – indications, technique
- Permanent pacing
- Indications
- Types of pacemakers and leads
- Setting up the laboratory for permanent pacing
- Pacemaker parameter checking
- Follow-up of pacemaker patients
- Cardiac electrophysiology study
- Catheters used in electrophysiology studies

Text book recommended:

Cardiac Catheterization – Grossman

BIOSTATISTICS AND RESEARCH METHODOLOGY

- **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 fromgraph.
- **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.

INTERNSHIP

POSTINGS DURING ONE YEAR INTERNSHIP:-

3 MONTHS – CATH LAB AND BLOOD BANK

3 MONTHS – ECHO ROOM

3 MONTHS – ICCU

3MONTHS – HOLTER (AMBULATORY ECG)

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