



**BHARATH INSTITUTE OF HIGHER EDUCATION AND RESEARCH**

(Declared as Deemed-to-be University under section 3 of UGC Act 1956)

**பாரத் பல்கலைக்கழகம்**



# **B.Sc - ALLIED HEALTH SCIENCES**

## **COURSE REGULATIONS-2017**

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### **Cardiac Technology**

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**Cardiac Technology**

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## **REGULATIONS FOR B.Sc. (ALLIED HEALTH SCIENCE)**

### **COURSE: 2017**

#### **Introduction**

B.Sc. (Allied Health Science), a (3-year course work + 1-year internship) program under the Faculty of Allied Health Sciences, is aimed at training students to prepare them as qualified physician assistants who will be able to meticulously assist the concerned specialist in handling the various illnesses. This program is a taught course that covers relevant topics and specialized areas of knowledge as opted. The aim of this B.Sc. Program is to provide a thorough training to the candidates through formal lectures and/or seminars and practical programs which culminate in a one year internship that finally prepares the student for the rigors of the medical world.

#### **1. Short Title and Commencement**

These Regulations shall be called the “Regulations for B.Sc. (Allied Health Science) Course” of BIHER. These regulations shall be deemed to have come into force from the academic year 2017-18. These regulations are subject to modifications as may be approved by the Academic council from time to time.

#### **2. Eligibility for Admission**

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

#### **3. Age limit for admission**

A candidate should have completed the age of 17 years as on 31s December of the year of admission.

#### **4. Eligibility Certificate**

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

#### **5. Registration**

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

**6. Duration of the course**

The duration of the B.Sc. (Allied Health Science) Degree Course shall be (3-year course work + 1-year internship) comprising of 8 (eight) semesters and one year (semesters 7 & 8) of compulsory internship. The candidate is required to pursue the course on a full time basis, and must complete the course within seven years from the date of provisional registration.

**7. Commencement of the Course**

The course shall ordinarily commence on 1st August of the academic year. Admission for the said course shall be completed by 31st August.

**8. Curriculum**

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

The first two semesters will be spent on Pre and Para clinical subjects including Anatomy, Physiology, Biochemistry, Basics in Medical Physics, English, Computers, Microbiology, Pathology, Pharmacology, Environmental Science and Community Medicine and Nursing. At the beginning of the third semester students will be assigned to branch of Specialization, to which allotted and they will proceed with the specialty during the third, fourth, fifth and sixth semesters,

The fourth year of the course shall be compulsory internship in the respective specialty. The Syllabus for the course shall be as specified in the regulation.

**9. Medium of Instruction**

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

**10. Working Days**

In the case of I to VI semesters, each semester shall consist of not less than 100 working days and each academic year shall have a total of 200 working days or above. In the case of VII & VIII semesters, each semester shall have 140 working days.

**11. Attendance**

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

**12. Condonation of Lack of Attendance**

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

Lack of attendance can be condoned up to a maximum of 5% of the minimum attendance required in the following exceptional circumstances:

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

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

### 13. Commencement of the examinations

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

### 14. Cut-off dates for admission to the examinations

The candidates admitted from 1st August to 31st August of the academic year shall be registered to take their first semester examination in the month of December of the academic year after fulfilment of the stipulated regulations.

### 15. Grading system

All assessments of a course shall be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain points, will be awarded as per the range of total marks (out of 100) obtained by the candidate, as detailed below:

Marks	Grade Points	Letter grade
90-100	10.0	O
85-89	9.0	AA
80-84	8.5	AB
75-79	8.0	AC
70-74	7.5	BA
65-69	7.0	BB
60-64	6.5	BC
55-59	6.0	CA
50-54	5.5	CB
45-49	5.0	CC
40-44	4.5	DA
0-39	0	RA
Incomplete	0	I
Not appeared	0	NA



“RA”	Reappearance	-	denotes failure and the candidate is required to reappear for that examination
“I”	Incomplete	-	denotes not eligible to appear for the End-Semester examination.
“NA”	Not appeared examination although eligible.	-	denotes that the student did not appear for the
“O”	Outstanding		

After results are declared, Grade Statement will be issued to each student which will contain the following details:

- The college in which the candidate has studied
- The list of subjects enrolled during the semester and the grades scored.
- The Credits awarded and accumulated.
- The Grade Point Average (GPA) for the semester and
- The Cumulative Grade Point Average (CGPA) of all subjects enrolled from first semester onwards.

GPA is the ratio of, the sum of the products of the number of credits of subjects ( C ) and the grade points scored in those subjects ( GP), to the sum of the credits of all the subjects in that semester.

$$\text{GPA} = \frac{\text{Sum of [C} \times \text{GP]}}{\text{Sum of C}}$$

CGPA will be calculated using the above formula, considering all the subjects enrolled from first semester onwards. “RA”, “I” and “NA” grade will be excluded for calculating GPA and CGPA.

## 16. 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:

CGPA (Percentage)	Classification
10.0 (90-100%)	First class with honours
8.0-9.9 (75-89%)	First class with Distinction
6.5 to 7.9 (60-74%)	First class
4.5 to 6.4 (40-59%)	Second class

- 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 40-59% in gross percentage will be classified to have passed in Second Class.

### 17. Continuous (Internal) Assessment

- a. Continuous (Internal) Assessment for Theory shall be the average of the best two out of three.
- b. Continuous (Internal) Assessment for Practical's shall be the average of the best two out of three.
- c. The minimum Internal Assessment will be 40% separately for Theory & Practical

### 18. Semester – End Examination (University/Department)

- a) The examination in B.Sc. (Allied Health Science) shall consist of Written Theory examinations and Practical Examinations. The semester – End Examination (University /Department) shall be conducted at the end of each semester.
- b) Papers for which Internal Examination is recommended by the Board of Studies and approved by the Academic Council, the following criteria shall be followed.
- i) The weight age for Continuous (Internal) Assessment and Internal Examination (to be conducted by the respective department) shall be in the ratio of 25% and 75% respectively.
- ii) The Continuous (Internal) Assessment marks shall be the average of the best two out of three. The date of Semester – End Examinations (Internal examinations) shall be as per the University guidelines.

### 19. EXAMINATION PATTERN (for all specialties) (with practical) – UNIVERSITY EXAM.

A. Theory	Max. Marks – 60	Duration: 2 1/2 hrs
I. Essay Questions (2×10)	20 Marks	
II. Short Notes (8×5)	40 Marks	
B. Practical		
<b>I. Practical (Including Oral)</b>	<b>20 Marks</b>	
<b>C. Continuous (Internal) Assessment</b>		
I. Theory	10 Marks	
II. Practical	10 Marks	
Internal Examination		
<b>Short Notes or Short Answers</b>	<b>8×5 = 40</b>	
IA	= 10	
<b>Total</b>	<b>50</b>	

**20. Marks Qualifying for a Pass**

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

- a) 40% minimum in the End-Semester examination as well as 40% aggregate marks (continuous assessment and End – Semester examination). The minimum marks for internal assessment shall be 40%.
- b) For papers which are internally evaluated the same distribution of 25% for Continuous (Internal Assessment and 75% for Semester – end Examination (which shall be conducted by the respective department) shall be followed.

**21. Carry-over of failed subjects**

A candidate, who fails in any one or more of the first year subjects, shall be permitted to carry over the subjects to the second year. However a candidate should clear all the

Subjects of the second year along with the carried over subjects of the first year before getting promoted to the third year. The student shall start the Internship training (VII & VIII semester) only after he/she clears all the papers from Semester I to Semester VI.

**22. Revaluation of answer papers**

There shall be no revaluation of answer papers of failed candidates. Failed candidates are however, permitted to apply to the University for retotaling within fifteen days of publication of the results for retotalling.

**23. Temporary break of study**

- a) A Candidate is not normally permitted to temporarily break the study.
- b) If a candidate is continuously absent from the institute for one year without any information / permission.
  - i) Having notified the Dean/Director/Principal within this period, this absence shall be treated as “Temporary Break of Study”.
  - ii) Without notifying the Dean/Director/Principal, his/her name will be removed from the institute rolls.
- c) If a candidate is compelled to temporarily break the study for valid reasons (such as accident or hospitalization due to prolonged ill health), he/she shall apply for condonation of the break to the Dean/Director/Principal through the Head of the Department.
- d) For condonable break of study:
  - i) If the lack of attendance is within condonable limits as per Clause No. 12 the candidate shall be permitted to write the examination for the current semester.
  - ii) If there is non-condonable lack of attendance, the candidate shall rejoin the program at the respective semester as and when it is offered after the break and shall be governed by the rules and regulations in force at the time of rejoining.

- e) The total period for completion of the programme reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in Clause No. 6 irrespective of the period of break of study in order that he/she may be qualified for the award of the degree.
- f) In any case, a candidate shall be permitted to temporarily break the study only once during the entire duration of the program. The candidate shall forfeit the registration in case of a second break or in case of a non-condonable break of study.
- g) Without prejudice to the above rules, the candidate who has completed the attendance requirement for a semester, but has proceeded on a condonable break of study without appearing for the University Examination, shall be permitted to appear for the examinations without repeating the semester and thereafter continue the subsequent semester.

**SCHEME OF EXAMINATION 2017**  
**B.Sc .ALLIED HEALTH SCIENCES**  
**SEMESTER I (Common to all Courses)**

S.No	Paper	Teaching Hrs		Evaluation-University Examination {marks}					
		L	P	I.A.		University Exam		Total	Credits
				T	P	T	P		
1.	Anatomy[UE}	60	20	10	10	60	20	100	5
2.	Physiology[UE]	60	20	10	10	60	20	100	5
3.	Biochemistry [UE]	60	20	10	10	60	20	100	5
4.	Medical Physics[I.E]	60	20	10	-	-40	-	50	5
5.	English{I.E.}	60	-	10	-	-40	-	50	4
6.	Basics of Computers{i.e.]	30	30	10	-	-40	-	50	4
								Total	28

**SEMESTER II (Common to all Courses)**

S.No	Paper	Teaching Hrs		Evaluation-University Examination {marks}					
		L	P	I.A.		University Exam		Total	Credits
				T	P	T	P		
1.	Microbiology[U.E.]	60	20	10	10	60	20	100	5
2.	Pathology [U.E.]	60	20	10	10	60	20	100	5
3.	Pharmacology [U.E.]	60	20	10	10	60	20	100	5
4.	Environmental Science &Community Med.[I.E.]	60	20	10	-	40	-	50	5
5.	Basics of Nursing[I.E.]	60	-	10	-	40	-	50	4
								Total no. of credits	24

U.E.-University Examination

I.E.-Internal Examination.

\*These examinations shall be conducted by the respective department.

**CARDIAC TECHNOLOGY  
SCHEME OF EXAMINATION 2017**

**SEMESTER-III**

		Hrs/Sem				Evaluation (Marks)			
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Applied Anatomy & Physiology related to Cardiac Tech (U.E.)	60	-	20	-	60	-	80	4
2.	Applied Anatomy & Physiology Practical(UE)	-	120	-	20	-	60	80	4
3.	Applied Pharmacology (U.E.)	60	-	20	-	60	-	80	4
4.	Pharm. Related to Cardiac Tech. Practical	-	120	-	20	-	60	80	4
5.	Sociology (I.E.)	60	-	20	-	60	-	80	3
6.	Basic Principles of Hospital Management (I.E.).	60	-	20		60	-	80	4
								Total Credits	23

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.

**CARDIAC TECHNOLOGY  
SCHEME OF EXAMINATION 2017**

**SEMESTER-IV**

		Hrs/Sem		Evaluation (Marks)					
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Medicine relevant to Cardiac tech. Theory.(U.E.)	60	-	20	-	80	-	100	5
2.	Medicine relevant to Cardiac tech.Practical(U.E)	-	120	-	20	-	60	80	5
3.	Introduction to Cardiac tech.Theory(U.E.)	60	-	20	-	80	-	100	5
4.	Introduction to Cardiac tech.Practical(U.E.)	-	380	-	20	-	60	80	5
5.	Biostatistics (I.E.)	60	-	20	-	-	-	80	4
<b>Total Credits</b>									<b>24</b>

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.

**CARDIAC TECHNOLOGY  
SCHEME OF EXAMINATION 2017**

**SEMESTER-V**

		Hrs/Sem				Evaluation (Marks)			
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Cardiac Tech.Clinical-I Theory (U.E.)	60	-	20	-	80	-	100	5
2.	Cardiac Tech.Clinical-II- Theory (U.E.)	60		20	-	80	-	100	5
3.	Cardiac Tech.Practicals (U.E.)		180	-	20	-	60	80	5
4.	Cardiac Tech. CLINICALS & Viva.	-	180	-	20	-	60	80	5
5.	Medical Ethics & Research Methodology(IE)	60	-	20	-	60	-	80	4
<b>Total Credits</b>									<b>24</b>

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.



**CARDIAC TECHNOLOGY  
SCHEME OF EXAMINATION 2017**

**SEMESTER-VI**

		Hrs/Sem				Evaluation (Marks)			
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Cardiac technology Applied. I- Theory (U.E)	60	-	20	-	80	-	100	5
2.	Cardiac Technology Applied.II - Theory(U.E)	60	-	20	-	80	-	100	5
3.	Cardiac Technology Clinical & Comprehensive Viva (U.E)		250	-	20	-	60	80	5
4.	Hospital Products, Promotion, Public Relations/ Physicians Office Management( I.E)	60	-	20	-	60	-	80	4
5.	Cardiac Life Support( I.E)	60	-	20	-	60	-	80	4
<b>Total Credits</b>									<b>23</b>

Total No. of Hours-500 hours.

U.E.-University Examination

I.E-Internal Examination.

**ALLIED HEALTH SCIENCES**  
**B.Sc. CARDIAC TECHNOLOGY - YEAR 2017**

**Objective**

B.Sc. Cardiac Technology or Bachelor of Science in Cardiac Technology is an undergraduate course. Cardiac technology is an area of specialization for allied health professionals. Cardiovascular technologists and technicians assist physicians in the diagnosis and treatment of cardiac (heart) and peripheral vascular (blood vessel) conditions. Cardiac technologists prepare patients for open-heart surgery and the implanting of pacemakers. Technologists monitor patients during these procedures. The course is three years duration and career orienting in nature that opens many jobs for them after its successful completion.

An ALLIED HEALTH SCIENCE professional is an important part of a multidisciplinary Health care team who provide support service and rehabilitation measures for the patients in the hospital.

**Duration of the course:** Three years followed by one year internship which is compulsory

**Medium of instruction: ENGLISH**

The first & second Semester syllabi for Allied Health sciences is common for all the courses.

**FIRST YEAR: (Semester I & II)**


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**MAIN SUBJECTS:**

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Anatomy	Physiology	Biochemistry
Pathology	Microbiology	Pharmacology

**SUBSIDIARY SUBJECTS:**

English, Computer, Medical physics, Environmental Science & Community, Medicine & Basics of Nursing.

Exams in subsidiary subjects shall be conducted at the college level and marks forwarded to the **university**.

**INTERNAL ASSESSMENT:**

1. Written tests-average of 2 tests, viva, assignments, aptitude, punctuality and Attitude.
2. Log book-It will have the recordings, of all activities department and date wise including practical demonstrations. There will not be a practical record

**INTERNAL ASSESSMENT MARKS:**

1. Written test etc.....	10
2. Log book & Practical.....	10
Total	20

80% ATTENDANCE & 40%of INTERNAL ASSESSMENT marks are essential to appear for the University Examination

University Exams shall be conducted at the end of each semester. (JUNE & DEC)

**SCHEME OF EXAMINATION SEMESTER I**

**(COMMON TO ALL COURSES FOR ANAESTHESIA TECHNOLOGY, CARDIAC TECHNOLOGY, MEDICAL LABORATORY TECHNOLOGY, RENAL DIALYSIS TECHNOLOGY, RADIOLOGY AND IMAGING SCIENCE TECHNOLOGY, PERFUSION TECHNOLOGY, RESPIRATORY CARE TECHNOLOGY)**

S.No	Paper	Teaching Hrs		Evaluation-University Examination {marks}					
		L	P	I.A.		University Exam		Total	Credits
				T	P	T	P		
1.	Anatomy[UE]	60	20	10	10	60	20	100	5
2.	Physiology[UE]	60	20	10	10	60	20	100	5
3.	Biochemistry [UE]	60	20	10	10	60	20	100	5
4.	Medical Physics[I.E]	60	20	10	-	-40	-	50	5
5.	English{I.E.}	60	-	10	-	-40	-	50	4
6.	Basics of Computers{i.e.]	30	30	10	-	-40	-	50	4
								Total	28

U.E.-University examination.

I.E.-Internal examination.

[These examinations shall be conducted by respective departments].

## **CARDIAC TECHNOLOGY**

### **SYLLABUS**

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## **SEMESTER – I**

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### **1. ANATOMY (UE)**

#### **UNIT I: Organization of the human body**

##### **1. Introduction**

- Introduction to human body
- Definition and subdivision of anatomy
- Anatomical position and terminology
- Region and systems of the body
- Cavities of the body and their contents
- Levels of organization of the body

##### **2. Cell and genetics**

- Parts of cell – cell membrane, cytoplasm, organelles, inclusion bodies, nucleus
- Structure of chromosome, DNA, RNA.
- Basics & fundamentals of Genetics, Karyotyping, Chromosomal disorders, prenatal diagnosis, genetic counseling and gene therapy.
- Cell division – Definition and main events that occur in different stages of mitosis and meiosis.
- Tissues – Definition, characteristic features and types with example.
- Types of glands with example

#### **UNIT II: Systems of support and movement**

##### **1. Skeletal system**

- Cartilage: Type and basic histological feature.
- Bones: definition, classification based on location, name and number of bones with general feature of important bones, function of bone, histological feature of a compact bone.
- Joints – Definition and types with example, Axis and movements. Shoulder, elbow, hip, knee joints – type, bones and ligaments involved, possible movements.

## 2. Muscular system

- Types of muscle with basic histological features
- Parts of skeletal muscle.
- Definition of origin and insertion
- Origin, insertion, nerve supply, action of sternocleidomastoid, pectoralis major, deltoid, gluteus maximums and diaphragm.

## UNIT III: Controls systems of the body

### 1. Nervous system

- Subdivisions of the nervous system
- Spinal cord-location, extent, external features and blood supply
- Brain-subdivision, location, external features of Medulla oblongata, Pons, Midbrain, Cerebellum, and Cerebrum, Thalamus and Hypothalamus, Location and subdivision of ventricles of brain. Circle of Willis.
- Cranial nerves-name, number, attachment, area of distribution
- Spinal nerves-typical spinal nerve. Name and location of plexuses. Location and distribution of brachial and lumbosacral plexus.
- Autonomic nervous system-sympathetic and parasympathetic nervous system. Location of pre-ganglionic and post-ganglionic neurons.

### 2. Sense organs

- Location and features of 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 testis. Names of hormones produced by each gland.
- Microscopic features of thyroid and pancreas.

## UNIT IV: Maintenance of the human body

### 1. Cardio vascular system

- Types and general features of blood vessels. Structure and types of arteries and veins. Shape, size, location, covering, external and internal features of Heart. Conducting system of heart. Blood supply of the heart. Name, location, branches and main distribution of principal arteries and veins

### 2. Lymphatic system

- General features of Lymph node and lymphatic vessels. Name, location, external features, microscopic feature of tonsil and spleen.

### 3. Respiratory system

- Name the organs of respiration. Location and features of Nasal cavity, pharynx, larynx, trachea, lung & pleura. Mention the microscopic feature of lung.

### 4. Digestive system

- Name the parts of the alimentary canal and accessory organs. Location & features of esophagus, stomach, small and large intestine. Location and feature of tongue, salivary glands, pancreas, liver and gall bladder. Microscopic feature of liver.

### 5. Urinary system

- Names of urinary organs. Location and features of kidney, ureter, urinary bladder & urethra. Microscopic feature of kidney.

### 6. Reproductive system

- Names of male and female organs of reproduction. Location and features of testis, epididymis, vas deferens, prostate gland and spermatic cord. Location & features of uterus, uterine tube, ovary and breast.

### 7. Embryology

- Structure of gametes & gametogenesis. Fertilization to development of embryo till 3rd week. Derivatives of germ layers. Teratogens, Structure and Functions of placenta.

## UNIT V: Anatomical regions

- Simple ideas about scalp, triangles of neck, axilla, cubital fossa, carpal tunnel, mediastinum, umbilicus, inguinal canal, femoral triangle
- Subsartorial canal popliteal fossa

## PRACTICALS/DEMONSTRATIONS

1. Demonstrations of dissected specimens.
2. Viewing of projection of microscopic slides of muscle, bone, cartilage, spleen, tonsil, lung, liver, kidney, thyroid and pancreas

## REFERENCE BOOKS

1. *Manipal manual for AHS by Dr. Sampath Madhyastha, (Second Edition) Published by CBS Publishers.*
2. *Handbook of anatomy for nurses by Dr. P. Saraswathi*
3. *Ross and Wilson, Anatomy and physiology in health & illness.*

## **2. PHYSIOLOGY (UE)**

### **UNIT-I**

#### **1. General Physiology:**

- Concept of Homeostasis
- Cell structure and functions
- Transport across membranes
- Body and body fluids:
- Body fluid volumes, compartments and composition
- Blood composition and functions
- Plasma proteins – Types and functions
- Erythrocytes – functions, Erythropoiesis, anemias
- Leucocytes – classification and functions
- Platelets – morphology and functions
- Blood coagulation – Mechanism and name of anticoagulants
- Blood groups – Basis of ABO & Rh grouping, Erythroblastosis Foetalis

#### **2. Muscle physiology:**

- Muscles – Classification & structure of striated, nonstriated & cardiac muscle
- Neuromuscular junction
- Mechanism of skeletal muscle contraction

#### **3. Digestive system:**

- Salivary glands, functions of saliva
- Parts of stomach, composition & functions of gastric juice
- Pancreatic Juice – composition & functions
- Bile – composition & functions of bile & bile salts
- Functions of Small intestine & large intestine

### **UNIT-II**

#### **1. Skin**

- Structure & Functions

#### **2. Excretory system:**

- Kidney: Basic physiological anatomy (Including JGA)

- Formation of urine – GFR
- Formation of urine – Reabsorption & secretion
- Micturition Reflex
- Dialysis – Principle, types
- Renal function tests

## UNIT-III

### 1. Endocrine system:

- Hypothalamo hypophyseal inter relationship
- Posterior pituitary hormones and its actions
- Anterior pituitary hormones, Growth hormone – Actions
- Dwarfism, gigantism, acromegaly
- Thyroid hormones – Actions
- Cretinism, Myxoedema, Grave's disease (clinical features)
- Parathyroid hormones – Functions, Tetany
- Insulin, Glucagons – Actions, Diabetes mellitus
- Adrenal medullary hormones & their actions
- Adrenal cortex hormones & their actions

### 2. Reproductive system:

- Male reproductive organs – Spermatogenesis, Testosterone actions
- Female reproductive organs – menstrual cycle (endometrial and ovarian cycles) and its hormonal control
- Contraceptive methods in male and female

## UNIT-IV

### 1. Respiratory system:

- Basic physiological anatomy
- Surfactant
- Mechanics of respiration
- Lung volumes and capacities
- Oxygen transport, Carbon-di-oxide transport
- Nervous and chemical regulation
- Pulmonary function tests.



## 2. Cardiovascular system:

- Basic physiological anatomy, innervations of heart
- ECG – normal waves, intervals and their significance
- Cardiac cycle – mechanical events, Heart sounds
- Blood pressure – Definition, measurement, normal values, factors maintaining BP Regulation

## UNIT-V

### 1. Nervous system:

- Structure of neuron, neuroglial cells, synapse and transmission across it
- Reflex – Components of reflex arc, examples.
- Functions of ascending tracts – anterior, lateral spinothalamic tracts, Dorsal column
- Functions of Corticospinal (Pyramidal) tract-Descending tract
- Functional areas of cerebral cortex
- Functions of basal ganglia, thalamus, hypothalamus, limbic system and cerebellum

### 2. Special senses:

- Receptors for various special senses

## Practical Demonstration

### Haematology:

1. Enumeration of RBC count.
2. Enumeration of WBC count.
3. Differential Count.
4. Estimation of Hemoglobin.
5. Determination of blood group.
6. Determination of bleeding time and clotting time.

### Clinical physiology:

1. Measurement of blood pressure.
2. Determination of Radial pulse

## REFERENCE BOOK

1. *Human Physiology for BDS* by A.K.Jain, 4th Edition, Avichal publishing co

### **3. BIOCHEMISTRY (UE)**

#### **UNIT I – Cell and its molecules**

**Cell** – Cell organelles, Fluid Mosaic Model, functions of cell membrane, Brief description of transport across the cell membrane.

**Carbohydrates** – Definition, Classification with examples, Sources, physiological significance and HbA1c.

**Lipids** – Definition, Classification with examples, Sources, Types of lipids present in the body, storage form, storage site, free cholesterol structure, functions of lipids, lipoprotein structure and its functions.

**Nucleic acids** – Nucleotide, Nucleoside, types of nucleic acids, secondary structure of DNA & Its functions; Types of RNA & its functions.

#### **UNIT II – Proteins and Enzymes**

**Proteins** – Definition, Classification, functions of proteins, Plasma proteins; Classification of Aminoacids with examples

Hemoglobin structure, Functions of hemoglobin, hemoglobin derivatives, Abnormal hemoglobin

**Enzymes:** Definition, Classification, coenzymes, Metalloenzymes, Factors affecting enzyme activity, Regulation of enzymes, over view of Mechanism of enzyme action, Isoenzymes and Clinical importance of enzymes

#### **UNIT III-Vitamins, Minerals, Nutrition**

**Vitamins:** Definition, Classification of Vitamins

Sources, RDA, Function & Deficiency symptoms of

- Fat Soluble Vitamins (A, D, E & K);
- Water Soluble Vitamins (Thiamine, Riboflavin, Niacin, Biotin, Pantothenic acid, Pyridoxine, Folic acid, Cobalamine) and Vitamin C

**Minerals:** Definition, Classification of Minerals

Sources, RDA, Function, Reference levels & Deficiency Symptoms of

- Calcium, Phosphorus, Iron Copper, Zinc, Sodium, Chloride, Iodine, Potassium, Fluorine and Selenium.

**Nutrition:** BMR, SDA, Dietary fibres, protein Energy Malnutrition and Obesity

#### **UNIT IV – Bioenergetics and Metabolism**

Bioenergetics: Electron Transport chain and Oxidative Phosphorylation

## **Metabolism**

**Carbohydrates:** Digestion and absorption, Glycolysis, TCA cycle, Metabolism of Fructose and Galactose.

**Lipids:** Digestion and absorption, Beta oxidation of fatty acids, Regulation of Cholesterol level in the cell and outline of lipid transport.

**Proteins:** Digestion and Absorption, Formation and Disposal of Ammonia, Urea Cycle, Special Products of Glycine, Tyrosine and Tryptophan.

## **UNIT V – Miscellaneous**

Outlines of DNA organization, Replication, Transcription, Genetic code and Translation

Organ function Tests: Liver, Renal and Bone.

## **PRACTICAL**

- Spotters

## **REFERENCE BOOK**

1. *Essentials of Biochemistry by Satyanarayana, Current edition and Allical publishers.*

## **4. BASICS IN MEDICAL PHYSICS AND ELECTRONICS (UE)**

### **UNIT I: Laser**

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

### **UNIT II: Radiation Physics**

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

### **UNIT III: Introduction to Imaging Technique**

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

### **UNIT IV: Semiconductor devices**

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

### **UNIT V: Biopotential Recording Systems**

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

### **REFERENCE BOOKS:**

1. New Understanding physics for advanced level – Jim Breithaupt.
2. Advanced Physics for you by Keith Johnson, Simmons hewett, Sue holt, John miller
3. Christensen's Physics of diagnostic Radiology by Thamos S. Curry III, M.D., Robert C Murry, Jr. Phd., Dow Dey, Phd.
4. Applied Electronics, A. Subramanyam, The National Publishing co., Madras (1996).
5. Design and Development of Medical Electronic Instrumentation, David Prutchi and Michael Norris, John Wiley & Sons (2005).

## **5. ENGLISH (IE)**

### **UNIT I : Spoken Communication**

Learning to reiad the phonetic symbols  
Stress  
Intonation  
Rhythm  
Commonly mispronounced words  
Correct pronunciation of important commonly used words in hospital practice

### **UNIT II : Vocabulary and Reading**

Special features of English vocabulary  
Common errors in choice of word  
Semi technical vocabulary  
Collecting material from library on scientific topics  
Comprehensive exercises

### **UNIT III : Writing**

Writing letters regarding permission, leave, opening bank account etc.  
Taking notes from lecture / reading materials  
Writing reports on patient care  
Summarizing scientific passages

### **UNIT IV : Grammatical and Idiomatic Usage**

Correction of errors  
Types of interrogative sentences  
Active-Passive voice  
Tense  
Principles of procession, clarity and specific it

## **6. BASIC OF COMPUTERS (IE)**

### **UNIT I: INTRODUCTION**

Computer basics – Types of computers – hardware components – input devices – output devices – storage devices – memory – units and sizes – factors affecting performance – operating systems – applications software – networking – LAN and WAN – Accessories – backup – computer virus – software copyright.

### **UNIT II: WORD PROCESSING**

Windows – Office automation – WORD processor – open a new document – toolbars – menus – font dialog box – enter text – scroll – spelling checker – Autocorrect – undo and redo – bullets and numbered lists – indenting – moving and copying – find and replace – autosshapes – saving document – preview and print.

### **UNIT III: ELECTRONIC SPREADSHEET AND DATA PRESENTATION**

EXCEL spreadsheet – grid of rows and columns – active cell – selecting range – entering data – editing data – row and column labels – adjusting width – creating and copying formulae – relative – logical functions – lookup function – creating chart – bar chart – pit chart – print and save.

POWERPOINT presentation – creating slide shows- building outline – switching levels in outline – adding pictures – slide designs – design templates – formatting – color scheme – customized backgrounds – inserting content – hyperlink – revolution in education.

### **UNIT IV: DATABASE MANAGEMENT SYSTEM**

ACCESS database – concept – template – primary key – records and fields – Student roster database – input mask – adding records – viewing data – updating entries – searching and querying – sorting – Table, forms and reports.

### **UNIT V: APPLICATIONS IN HEALTH CARE AND MEDICINE**

INTERNET – e-governance – access to information – communication facility – mechanics of E-mail – social transformation – electronic billing – drug information – information flow in lab and radiology – storage of medical records – networking the organization – patient care – intelligent monitoring – scholarly information – health informatics – robotic assisted surgery – Clinical decision support systems – Telemedicine.

### **REFERENCES BOOKS**

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

**B.SC. ALLIED HEALTH SCIENCE 2017****SCHEME OF EXAMINATION SEMESTER II****(COMMON TO ALL COURSES FOR ANAESTHESIA TECHNOLOGY, CARDIAC TECHNOLOGY, MEDICAL LABORATORY TECHNOLOGY, RENAL DIALYSIS TECHNOLOGY, RADIOLOGY AND IMAGING SCIENCE TECHNOLOGY, PERFUSION TECHNOLOGY, RESPIRATORY CARE TECHNOLOGY)****SEMESTER II (Common to all Courses)**

S.No	Paper	Teaching Hrs		Evaluation-University Examination {marks}					
		L	P	I.A.		University Exam		Total	Credits
				T	P	T	P		
1.	Microbiology[U.E.]	60	20	10	10	60	20	100	5
2.	Pathology [U.E.]	60	20	10	10	60	20	100	5
3.	Pharmacology [U.E.]	60	20	10	10	60	20	100	5
4.	Environmental Science &Community Med.[I.E.]	60	20	10	-	40	-	50	5
5.	Basics of Nursing[I.E.]	60	-	10	-	40	-	50	4
								Total no. of credits	24

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**CARDIAC TECHNOLOGY****SYLLABUS**

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**SEMESTER – II**

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**1. MICROBIOLOGY (UE)****UNIT – I: General Bacteriology**

Introduction & History of Microbiology, Classification & Morphology of Bacteria, Growth & nutrition, Culture Media & Methods, Sterilization & Disinfection, Fundamental aspects of antibacterial agents and antimicrobial susceptibility testing.

**UNIT – II: Immunology**

Infection, Immunity, Immunization schedule, applications of antigen antibody reactions, Hypersensitivity, Tumor & Transplantation Immunology.

**UNIT – III: Virology**

Introduction to virology, viral hepatitis, poliomyelitis, Rabies, Human immunodeficiency virus.

**UNIT – IV: Mycology & Parasitology**

Introduction to mycology, pathogenic yeasts & fungi, Introduction to parasitology, Amoebiasis, Malaria, Helminthic infections.

**UNIT – V : Applied Microbiology**

Outline of common bacterial diseases, treatment & prevention-Respiratory tract infections (upper & lower), Meningitis (septic & aseptic), Enteric infections (food poisoning & gastro enteritis), Anaerobic infections, Skin & soft tissue infections, Urinary tract infections, Sexually transmitted diseases, Tuberculosis & Leprosy, Hospital acquired infections, Biomedical waste management.

**PRACTICAL EXERCISES:** Spotters, Gram staining.

**REFERENCE BOOKS**

1. *Textbook of Microbiology by Ananthanarayan & Panicker's, 8th edition-Universities Press (India) PVT LTD.*
2. *Textbook of Microbiology by C. P. Baveja, 4th edition, Arya Publications.*
3. *Textbook of Medical Parasitology, CK Jayaram Paniker, 5th edition, Jaypee Publications.*
4. *Medical Parasitology by C. P. Baveja & V. Baveja, 2nd edition, Arya Publications.*
5. *Publications.*



## **2. PATHOLOGY (UE)**

**UNIT-I:** General Pathology I: Cellular Pathology, Acute and Chronic Inflammation, Tissue Renewal Regeneration and Repair, Hemodynamic Disorders Thromboembolic Disease And Shock

Introduction to Pathology, Adaptations Of Cellular Growth And Differentiation, Causes Of Cell Injury, Mechanisms Of Cell Injury, Necrosis, Apoptosis, Pathologic Calcification, Cellular Aging, Acute Inflammation – Mediators Of Inflammation Outcomes Of Acute Inflammation, Morphologic Patterns Of Acute Inflammation, Chronic Inflammation – Causes Of Chronic Inflammation, Granulomatous Inflammation, Healing By Repair, Scar formation And Fibrosis, Cutaneous Wound Healing, Healing By First Intention, Healing By Second Intention, Edema, Hemostasis and Thrombosis, Infarction, Shock

**UNIT-II:** General Pathology II: Diseases of the Immune System, Neoplasia, Environmental And Nutritional Disease, Diseases Of Infancy And Childhood

Innate Immunity, Adaptive Immunity, Components Of The Immune System, Mechanisms Of Hypersensitivity Reactions, Acquired Immunodeficiency Syndrome (AIDS), Neoplasia – Definition and Nomenclature, Characteristics Of Benign And Malignant Neoplasms, Molecular Basis Of Cancer, Essential Alterations For Malignant Transformation, Clinical Aspects Of Neoplasia, Laboratory Diagnosis Of Cancer, Common Environmental And Nutritional Pathology, Nutritional Diseases, Tumors And Tumor-Like Lesions Of Infancy And Childhood

**UNIT-III:** Systemic Pathology I: Blood Vessels, the Heart, Red Blood Cell and Bleeding Disorders, Diseases Of White Blood Cells

Arteriosclerosis, Atherosclerosis, Hypertensive Vascular Disease, Ischemic Heart Disease, Hypertensive Heart Disease, Valvular Heart Disease, Infective Endocarditis, Rheumatic Fever And Rheumatic Heart Disease, Cardiomyopathies, Leukopenia, Anemias, Polycythemia, Bleeding Disorders, Reactive Proliferations Of White Cells, Definitions And Classifications of Lymphoid Neoplasms and Myeloid Neoplasms, Splenomegaly.

**UNIT-IV:** Systemic Pathology II: The Lung, The Gastrointestinal Tract, Liver And Biliary Tract

Acute Respiratory Distress Syndrome, Obstructive Pulmonary Diseases, Pulmonary Infections, Gastritis, Peptic Ulcer Disease, Inflammatory Bowel Diseases, Liver Function Tests, Hepatic Failure, Cirrhosis, Portal Hypertension, Jaundice, Cholelithiasis

**UNIT-V:** Systemic Pathology III: The Urogenital System, The Breast, The Endocrine System, Bones Joints And Soft-Tissue, Peripheral Nerve And Skeletal Muscle, The Central Nervous System

Renal Function Tests, Nephrotic Syndrome, Nephritic Syndrome, Urolithiasis, Pap Smear, Carcinoma Of The Breast-Types And Classification, Thyroid Gland – Hyperthyroidism, Hypothyroidism, Thyroiditis, Graves Disease, Diffuse And Multinodular Goiters, Parathyroid Glands – Hyperparathyroidism, Hypoparathyroidism, Diabetes Mellitus, Fractures, Osteomyelitis, Arthritis, Osteoarthritis, Rheumatoid Arthritis, Infectious Arthritis, Diseases of Peripheral Nerve, Diseases of Skeletal Muscle, Infections of CNS – CSF Findings

### **REFERENCE BOOKS**

1. *Pocket companion to Pathologic Basis of Disease by Robbins and Cotran, 7th edition, Saunders.*
2. *Pathology Quick Review and MCQs by Harsh Mohan, 2nd edition, Jaypee Publications.*

### **3. PHARMACOLOGY (UE)**

#### **UNIT-I: General Pharmacology**

Introduction to pharmacology-various terminologies-sources & routes of drug administration – Absorption & Factors modifying drug absorption – Distribution of drugs – Metabolism: Phase II, - Excretion: routes, modes & kinetics of elimination – Excretion – Mechanism of drug action in brief, synergism & antagonism and Factors modifying drug action – Adverse drug reactions – ADR reporting & monitoring – Drug interactions.

#### **UNIT-II: Central Nervous System & Respiratory System**

Introduction to CNS and Neurotransmitters, drugs used in insomnia, Sedatives and hypnotics – diazepam – alprazolam, anti anxiety drugs, Antiepileptics – phenytoin, carbamazepine, sodium valproate, General Anesthetics – halothane, isoflurane, sevoflurane – Local Anesthetics – lignocaine – list of other drugs, Alcohols – ethyl alcohol – disulfuram, Anti parkinsonians – levodopa – carbidopa, Opioids – morphine – naloxone – tramadol – pentazocine, NSAIDs – aspirin – diclofenac – ibuprofen – paracetamol – cox 2 inhibitors. Drugs used in bronchial asthma and cough

#### **UNIT-III: Cardio vascular system & blood**

Drugs used in Ischemic Heart Disease-nitrates-Calcium channel blockers-nifedipine, verapamil-list of other drugs – Beta blockers – propranolol, atenolol – metoprolol and antiplatelets – aspirin, clopidogrel, and names of other drugs-fibrinolytic drugs-streptokinase and other drugs, Drugs used in CCF-digoxin and list of other drugs useful in CCF, Shock. Diuretics: 4 groups – Thiazides, Loop diuretics, Potassium sparing and osmotic diuretics. Hypertension – outline of drugs used in hypertension, Renin angiotensin system – ACE inhibitors – captopril, ramipril and names of other drugs – Receptor antagonist – losartan and list of other drugs, Antiarrhythmic drugs-classification – Quinidine, Lignocaine and amiodaron – Drugs for Hypercholesterolemia – statins. Drugs for anemia – oral & parenteral iron preparations, folic acid, vit B12 and erythropoietin. Coagulants and anti coagulants

#### **UNIT-IV: Hormones and GIT**

Contraceptives – oral and injectable, Corticosteroids – glucocorticoids – hydrocortisone-prednisolone-dexamethasone and names of topical steroids – Insulin – Oral hypoglycemic – sulphonyl ureas, biguanides and others, Thyroid and Antithyroid drugs, Sex Hormones-Estrogen and anti estrogens, Progestin and Anti progestins, Androgen And anti androgens.

Emetics and anti emetics-metoclopramide and domperidone, Drugs used in peptic ulcer, constipation-lactulose & Diarrhea-ORS-Loperamide.

#### **UNIT-V: Chemotherapy and Miscellaneous**

Introduction – Beta lactum antibiotics: Penicillins – natural, semi synthetic penicillins – amoxicillin – cloxacillin-clavulanic acid – sulbactam – Cephalosporins – cephalexin – cefuroxime – cefixime – ceftriaxone-cefipime, Broad spectrum antibiotics – Doxycycline – chloramphenicol-imipenem-Macrolides – erythromycin, azithromycin and others – Quinolones- ciprofloxacin and list of other drugs and sulfonamides- cotrimoxazole- Amino glycosides-gentamycin, amikacin and names of

other drugs Anti TB-first line drugs, Anti leprosy-dapsone and clofazimine Anti malarial- chloroquine- mefloquine and artemisinin, Anti fungal- amphotericin B- fluconazole and topical drugs & Anti viral drugs- acyclovir and anti HIV, Anti protozoals- metronidazole – Anthelmintics- albendazole- praziquantel.

Anti cancer drugs-Introduction – Anti metabolites- methotrexate- 6 mercapto purine- Alkylating agents- cyclophosphamide- busulphan and cisplatin – Plant products- vinblastin- vincristine- taxanes, antibiotics-actinomycin D- monoclonal antibodies.

Immuno modulators- cyclosporine, tacrolimus, azathioprine and steroids.

Toxicology-Drugs used in common poisoning, organophosphates, methyl alcohol, Benzodiazepam.

### **REFERENCE BOOKS:**

1. *Lippincott's Illustrated Reviews: Pharmacology, 5th edition, by Richard A. Harvey and Pamela C. Champe, Lippincott Williams & Wilkins Publisher*
2. *Essentials of Medical Pharmacology: K.D. Tripathi, 6th edition, Jaypee Publishers.*

## **4. ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE (IE)**

### **UNIT – I:**

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

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

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

### **UNIT – II:**

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

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

### **UNIT – III:**

**Concept of health & disease:** Concept of health, Definition of health, Philosophy of health-Dimension of health – Concept of well being, Spectrum of health, Responsibility of health – Determinates of health & Indicators of health – Concepts of disease & Concepts of cessation – Natural history of disease – Iceberg phenomenon, Concepts of control – Concepts of prevention – Modes of Intervention, Changing pattern of disease.

### **UNIT – IV:**

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

### **UNIT – V:**

**Environment & health:** Definition & components (environment sanitation environmental sanitation) Water: Safe & Whole some water Requirements Uses source of water supply (sanitary well)-

Purification of water (1). Large scale purification, (2). Small scale purification – Water Quality – Special treatment of water

**Air:** Composition The air of occupied room discomfort. Air pollution & its effects. Prevention & Control of air pollution

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

**PRACTICALS:**

1. Epidemiology Problems
2. Environmental spotters

**REFERENCE BOOK**

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

## **5. BASICS OF NURSING (IE)**

### **CONTENTS**

#### **UNIT I: Introduction of Health**

Health care system, major health problems of the country, nature of disease pattern, technological advances and national health programmes, health for all by 2000 AD. Role of health care workers in the health care delivery system, impact of illness of the individual family and community.

History of Nursing

#### **Communication Skills**

Relationship with patients, process of communication

#### **UNIT II: Concept of Nursing**

Nursing Processes

Problems solving approach, assessment, diagnosis, planning, implementation and evaluation.

#### **UNIT III: First Aid and Nursing in Emergencies**

Definition, basic principles, scope and rules

Wounds, haemorrhages, shock, fracture, dislocation and muscle injuries, respiratory emergencies, resuscitation, unconsciousness, Miscellaneous conditions, burns, scalds, foreign bodies in the skin, eyes, ear, nose, throat and stomach.

Frost bite, effects of heart cramps, bites and stings.

Poisoning

Transporting injured persons.

#### **UNIT IV: Personal Hygiene and Health**

Care of skin, mouth, eyes, nails, hair

Menstrual hygiene, clothing, mental health, common health problems of poor personal hygiene.

Comfort, Rest and Sleep

Hospital Housekeeping

#### **UNIT V: Health Education**

Introduction to principles and methods of health education. Use of audio visual aids, mass education, role of nurse in health education.

## LIST OF BOOKS

### Anatomy

1. *Manual of Anatomy and Physiology* – Prof. P.Saraswathi (Vengadam Publishers, Phone no: 044-26263469)
2. *BD Chaurasia: Gemera; human anatomy*

### Physiology

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

### Psychology

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

### Psychology

1. *Psychology – The Sciences of Behaviour – Fifth edition 1982* – Neil Carlson – William Bulkist – Allyn and Bacon.
2. *Psychology made simple* – Abraham Sperling, Ph. D -Advisory editor – M.S. Gill. MA, Ph D- 'Made simple books' –W.H. Allen, London.

### Elements of health and nursing principles

1. *Clint & Geraldine, 2011, Potter and Perry's fundamentals of Nursing, Elsevier publications.*

### English

1. *Effective English Communication* by Krishna Mohan and Meenakshi Raman, Tata McGraw – Hill Publishing Company Limited, New Delhi. (Approx. Cost Rs. 200)
2. *English for colleges and Competitive Exams* by Dr. R. dyvadatham, Emerald Publishers (Approx. cost Rs. 150)

### Microbiology

1. *Prof CP Baveja – Text book of Microbiology.*
2. *Satish Gupte – Text Book of Microbiology*

### Pathology

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

### Pharmacology

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*

### **Medical Physics**

1. *Basic Radiological physics – K. Thayalan, Jaypee Brothers, Medical Publishers (P) Ltd, New Delhi.*
2. *Lasers and optical fibre communications-P. Sarah, I.K. International publishing House Pvt, Ltd. New Delhi.*

### **Community Medicine**

1. *Park's Textbook of Preventive and Social Medicine-23rd Edition*



**CARDIAC TECHNOLOGY  
SCHEME OF EXAMINATION 2017**

**SEMESTER-III**

		Hrs/Sem				Evaluation (Marks)			
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Applied Anatomy & Physiology related to Cardiac Tech (U.E.)	60	-	20	-	60	-	80	4
2.	Applied Anatomy & Physiology Practical(UE)	-	120	-	20	-	60	80	4
3.	Applied Pharmacology (U.E.)	60	-	20	-	60	-	80	4
4.	Pharm. Related to Cardiac Tech. Practical	-	120	-	20	-	60	80	4
5.	Sociology (I.E.)	60	-	20	-	60	-	80	3
6.	Basic Principles of Hospital Management (I.E.)	60	-	20		60	-	80	4
<b>Total Credits</b>									<b>23</b>

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.

## **CARDIAC TECHNOLOGY**

### **SYLLABUS**

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## **SEMESTER – III**

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# **1. APPLIED ANATOMY & PHYSIOLOGY AS APPLIED TO CARDIOLOGY - TECHNOLOGY**

### **Course Objective**

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

### **UNIT I: Anatomy (Part – 1)**

- Anatomy of the heart and great vessels
- Gross anatomy and structural features of cardiac chambers Atrium, Ventricle, AV junction, Heart valves, Specialized conduction tissues, Sinus node, Inter nodal tracts, AV node, Bundles
- Innervations of the heart – Sympathetic, Parasympathetic, Sensory.
- Anatomy of respiratory system

### **UNIT II: Anatomy (Part – 2)**

- Coronary vascular system-Coronary arteries, Myocardial capillary bed, Venous drainage, Lymphatic drainage,
- Systemic circulation-Arterial system, Venous system, Lymphatic system, Tissue perfusion and microcirculation
- Pulmonary Circulation-Pulmonary artery, Pulmonary veins, Bronchial artery
- Cerebral circulation
- Renal circulation

### **UNIT III: Physiology (Part – 1)**

- Over view of the cardiovascular system – Function of CVS, Circulation of blood, Central control of cardio vascular system
- Cardiac cycle-Mechanical events, Arterial cycle and central venous pressure cycle, Clinical aspects of human cardiac cycle
- Cardiac excitation and contraction, Nervous control of the heart rate
- Mechanism of contraction, Pacemaker of conduction system.

### **UNIT IV: Physiology (Part – 2)**

- Assessment of Cardiac output-Fick's principle, Thermal dilution and indicator dilution methods, Pulse Doppler methods, Miscellaneous methods
- Control of stroke volume and cardiac output
- Hemodynamics – Relationship between pressure, flow and resistance, Solute transport between blood and tissues, Circulation of fluid between plasma, interstitium and lymph

### **UNIT V: Physiology (Part – 3)**

- Vascular smooth muscle
  - Mechanism of contraction, Pharmacomechanical coupling, automaticity
  - Control of blood vessels
  - Local control mechanisms, Nervous control, Hormonal control
- Specialization in individual circulation
  - Coronary circulation, Cerebral circulation, Pulmonary circulation, Cutaneous circulation
- Cardiovascular receptors, reflexes and central control, Coordinated cardiovascular responses, Posture, Valsalva manoeuvre, Exercise, Diving reflex, cardiovascular responses in pathological situations, Shock and haemorrhage, Syncope, Essential hypertension, Chronic cardiac failure
- Respiratory physiology

Mechanics of respiration, Principles of gas exchange regulation of respiration
- Hematology and coagulation physiology blood components

Blood groups, Blood transfusion, Hemostasis

## **2. APPLIED ANATOMY & PHYSIOLOGY PRACTICAL (U.E.)**

### **1. Anatomy**

Chart: Anatomy of heart muscles, vessels, conduction system, entire structure of heart, anatomy of circle of villus, charts and Images related to renal circulation.

Spotters: Model of The Heart And Coronary Arteries

### **2. Physiology**

**Charts:** Cardiac cycle

**Spotters:** Pulse oximeter, CPR, Stethoscope, placement of electrodes, CPR BP apparatus, Defibrillator, stethoscope

**CHARTS:** Cardiac excitation and contraction

Normal ECG, Cardiac cycle chart

Pacemaker of conduction system

Normal & abnormal intracardiac pressures

Heamostasis, Blood transfusion, grouping & typing

**Exam pattern (UE) Total marks-60**

1. SPOTTERS – 10 (10X2=20)

2. CHARTS/STATIONS – 5 (5X4=20)

3. VIVA – 20

### **3. APPLIED PHARMACOLOGY (U.E.)**

#### **Course Objective**

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

#### **UNIT I: Anti Anginal Agents**

- a) **Beta Blocking agents** – Propranolol, Atenolol, Metoprolol, Labetolo, Pindolol.
- b) **Nitrates** – Nitroglycerine, Isosorbide dinitrate, Isosorbide mononitrate, transdermal nitrate patches.
- c) **Calcium channel blockers** – Nifedipine, verapamil, dilitazem, new calcium channel blockers.

#### **UNIT II: Anti Failure Agents & Anti arrhythmic agents**

- a) **Diuretics** – Furosemeide, Thiazide diuretics, Other thazide like agents, Potassium sparing diuretics, Combination diuretics, Special diuretic problems.
- b) **Angiotensin converting enzyme (ACE) inhibitors. Types of ace inhibitors** – Captopril, Enalapril, Ace inhibitors for diabetics and hypertensive renal disease.
- c) **Digitalis and acute inotropes** – Digoxin, Digitoxin, Doubutamine, Dopamine, Adrenaline, Nonadrenaline, Isoprenaline, Mixed inonotropic vasodilators amrinone.
- d) Quinidine and related compounds, Procainamide, Lidocaine, Mixilitine, Phenytoin, Flecainide, amiodarone, Benetylium, Combination therapy

#### **UNIT III: ANTI Hypertensive drugs**

Diuretics, Beta Blockers, Ace inhibitors, Calcium antagonists, Direct vasodilators, Centrally active and peripherally active vasodilators.

#### **UNIT IV: Antithrombotic agents**

- a) Platelet inhibitors – Aspirin, Persantine
- b) Anticoagulants – Heparin, Warfarin
- c) Fibrinolytics – Streptokinase, Urokinase, Combination therapy

#### **UNIT V: Lipid lowering and anti atherosclerotic drugs**

## **4. PHARMACOLOGY RELATED TO CARDIOLOGY** **PRACTICAL (U.E.)**

### **PHARMACOLOGY:**

**SPOTTERS:** Ambu bag, venture mask, streptokinase, Infusion pump, Dobutamine Calculation chart, Riles tube, ET tube, O2 mask

**CHARTS:** Indication, dosage, contraindications effects of all cardiac drugs

### **Exam pattern (UE) Total marks – 60**

4. SPOTTERS – 10 (10X2=20)
5. CHARTS / STATIONS – 5(5X4=20)
6. VIVA – 20

## **5. MEDICAL SOCIOLOGY**

### **1. INTRODUCTION TO MEDICAL SOCIOLOGY**

#### **UNIT – I**

- Definition, objectives, principles, scope and its relevance to patient care.
- Difference between sociology of medicine and sociology in medicine.
- Historical development of medical sociology.
- Sociological perspective of health and illness.

#### **UNIT – II**

- Health, society and education

#### **UNIT – III SOCIAL EPIDEMIOLOGY**

- Meaning, socio-cultural factors bearing on health in India.
- Common occupational diseases and prevention of occupational diseases.

#### **UNIT – IV 1. HEALTH PROFESSION AND ORGANIZATION**

- Medical social service in a hospital
- Hospital as a social organization
- Professional qualities of a physician.

#### **PRINCIPLES OF SOCIOLOGY**

- Definition, objectives
- Nature and scope of sociology
- Origin and Nature of society.
- Social groups – characteristics and functions
- Social control
- Culture and civilization

### **2. SOCIOLOGY OF HEALTH AND HOSPITAL MANAGEMENT**

- Health, development and care
- Third world countries health
- Challenges of health and health care administration.

## **6. BASIC PRINCIPLES OF HOSPITAL MANAGEMENT (I.E.)**

(Common to all specialties – Anesthesia Technology, Cardiac Technology, Clinical Laboratory Technology, Renal Dialysis Technology, Radiology & Imaging Science Technology, Perfusion Technology, Cath Lab Technology & Blood Banking Technology)

### **UNIT I: Introduction to management & Organization:**

The evolution of Management, Definition and importance of Management. Planning – Organizing – staffing – Motivating – Leading – Controlling. Management of health care units (in brief). Individual behaviour in organization; organizational functioning (Group / Individual); Perception; Motivation MBO; Organizational Development.

### **UNIT II: Planning and Management of Hospitals & Clinical Services:**

Building and physical layout – space required for separate function – Planning of infrastructure facilities, clinical services, equipment & Human resources – Types of Hospitals. Organization and administration of various clinical services; outpatient services. In-patient services, emergency services, operation theatres, ICU's and super specialty services.

### **UNIT III: Organizing of support clinical services & Hospital management:**

Imaging – CSSD – Laboratory – Blood Bank – diet – Medical Records – Mortuary. Housekeeping – Maintenance (Water, Electricity, Civil, Air Conditioning, Lift) – Pest Control – transport – Security. Forecasting – Purchasing & procurement (Sourcing, methods and procedures) – Storing & issuing, Concept of inventory control, Maintenance of equipment and contracts (with special reference to major biomedical equipment). Trends in financing of Health and Hospital Services – Classification of Hospitals depending on source of financing – roles of financial institutions.

### **UNIT IV: Personnel and quality Management in Hospital & Marketing:**

Concepts – Manpower planning – Training & Development – Team Building – Conflict Management – Performance appraisal – Office rules and regulations Outline of Strategic Planning and Marketing. Concepts of quality – Professional Audit System – QA program – Medical Audit – Quality Circle – TQM – Patient Satisfaction – ISO 9000. A brief outline – computerization in hospital departments. Concept, Techniques, Indicators, Evaluation of Efficiency & Effectiveness evaluation of hospital and medical care services.

### **UNIT V: Ethical, current issues and Legal Aspects of Hospitals management services:**

Laws related to Hospital – Medico Legal Cases law of Torts – Autopsy – Dying declaration – CPA. Waste Management – Telemedicine – Organ Transplantation – Rehabilitation Service – Health Insurance. Operations Research and Quantitative Methods in Hospital Administration & Nursing Services in a Hospital.



**B.Sc. Allied Health Sciences**  
**CARDIAC TECHNOLOGY**  
**SCHEME OF EXAMINATION 2017**

**SEMESTER - IV**

		Hrs/Sem		Evaluation (Marks)					
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Medicine relevant to Cardiac tech. Theory.(U.E.)	60	-	20	-	80	-	100	5
2.	Medicine relevant to Cardiac tech.Practical(U.E)	-	120	-	20	-	60	80	5
3.	Introduction to Cardiac tech.Theory(U.E.)	60	-	20	-	80	-	100	5
4.	Introduction to Cardiac tech.Practical(U.E.)	-	380	-	20	-	60	80	5
5.	Biostatistics (I.E.)	60	-	20	-	-	-	80	4
<b>Total Credits</b>									<b>24</b>

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.

**CARDIAC TECHNOLOGY**

**SYLLABUS**

**SEMESTER – IV**

**1 MEDICINE RELEVANT TO CARDIAC TECHNOLOGY**

**(THEORY)**

**UNIT I : Cardiovascular System**

Ischaemic heart diseases

Rheumatic heart disease

Congenital heart disease

Hypertension

Aortic Aneurysms

Cardiomyopathy

Peripheral vascular disease

Pulmonary edema and LV failure

**UNIT II : Hematology**

Anaemia

Bleeding disorders

Laboratory tests used to diagnose bleeding disorders (in brief)

**UNIT III : Respiratory System**

Chronic obstructive airway diseases (COPD)

Concept of obstructive versus restrictive pulmonary disease

PFT and its interpretation

**UNIT : IV Others**

DM

Obesity

Pregnancy

Paediatric Patient (neonate/Infant)

Elderly patient

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## **2. MEDICINE RELEVANT TO CARDIAC TECHNOLOGY**

**(PRACTICAL)**

**PATHOLOGY:**

**CHARTS:** Entire pathological conditions of heart

PTCA procedures, prosthetic valve,

Pacemaker, contrast agents,

TIMIS score, Dukes score, Duckett Jones Criteria

**EXAM PATTERN (UE) Marks 60**

1. SPOTTERS – 10 (10X2=20)

2. CHARTS/STATIONS – 5 (5X4=20)

3. VIVA - 20

### **3. INTRODUCTION TO CARDIAC TECHNOLOGY**

#### **UNIT I: I. Electrocardiography (ECG)**

##### **1. Basic Principles**

The Electrocardiographic paper

The Electrocardiograph

The Electrical field of Heart

The leads: Standard limb, Precardial lead, 'V' lead & 'AV' lead

Basic ECG deflections

Basic action of electrocardiograph

##### **2. Normal ECG**

The 'P' wave

The 'qrs' complex

The genesis of 'qrs' complex

T wave; the S-T segment

The 'U' wave

Rate & rhythm

So called rotation of the heart – The Q-T interval

##### **3. The Electrical axis**

##### **4. Precardial pattern of ECG**

##### **5. Chamber enlargement – atrial enlargement, LV hypertrophy & RV hypertrophy**

##### **6. Bundle branch block**

General principle

Right Bundle branch block

Left bundle branch block

The Hemi blocks (Fascicular block)

#### **UNIT II: I. Exercise stress Testing**

1. Exercise Physiology

2. Exercise protocols

3. Electrocardiography measurements

4. Exercise testing – Indication, techniques & complications.

## **UNIT III: I. Echocardiography**

### **1. Principles of Echocardiography**

- Basic principles of ultrasound
- M-Mode of Echocardiography
- Two dimensional Echocardiography
- Doppler Echocardiography; color flow
- Transoesophageal Echocardiography
- Stress Echocardiography

### **2. Instrumentation**

- Basic pulse Echo system
- Transducers
- Pulse generation
- Echo detection
- A mode, B-Mode, M-Mode
- Display & recording

### **3. Echocardiographic Examination**

- Selecting transducers
- Position of the patient
- Placement of the transducer
- Setting control
- M-Mode labelling
- 2 D Echo
- Normal variants
- Terminology
- identification of segments

### **4. Doppler Echocardiography**

- a. Introduction to Doppler color Echocardiography
  - The Doppler principles
  - Doppler ultrasound techniques
  - Color Doppler flow imaging
  - Clinical application of Doppler Echocardiograph

- b. Physical principles & instrumentation in spectral & color Doppler flow imaging
- c. Physical principles and Doppler Effect. The Doppler

**Echocardiography system display**

- d. Blood flow pattern – Laminar & non- laminar flow
  - e. Doppler Echo cardiography modes
    - Continuous wave Doppler system
    - Pulsed Doppler system
    - High pulse repetition frequency
    - Problem of colour imaging
5. Contrast echo
6. Echo measurement

#### **4. INTRODUCTION TO CARDIAC TECHNOLOGY** **PRACTICAL (U.E.)**

PRACTICAL EXAMINATION:	Marks-60
Normal ECG interpretation	10
Normal Echo interpretation	10
<b>Instruments:</b>	
Monitor	
Defibrillator	
ECG & TMT	
CAT Lab. Machines	40
Total	60

## **5 .BIO STATISTICS**

### **Course Description:**

Introduction to basic statistical concepts: methods of statistical analysis; and interpretation of data

### **Behavioural Objectives:**

Understands statistical terms.

Possesses knowledge and skill in the use of basic statistical and research methodology.

### **UNIT – I : Introduction**

Meaning, definition, characteristics of statistics.

Importance of the study of statistics.

Branches of statistics.

Statistics and health science including nursing.

Parameters and estimates.

Descriptive and inferential statistics.

Variables and their types.

Measurement scales

### **UNIT – II : Tabulation of Data**

Raw data, the array, frequency distribution.

Basic principles of graphical representation.

Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, ogive.

Normal probability curve.

### **UNIT – III: Measure of Central Tendency**

Need for measures of central tendency

Definition and calculation of mean – ungrouped and grouped.

Meaning, interpretation and calculation of median ungrouped and grouped

Meaning and calculation of mode.

Comparison of the mean, and mode.

Guidelines for the use of various measures of central tendency.



#### **UNIT – IV : Measure of Variability**

Need for measure of dispersion.

The range, the average deviation.

The variance and standard deviation.

Calculation of variance and standard deviation ungrouped and grouped.

Properties and uses of variance and SO

#### **UNIT – V : Probability and Standard Distributions.**

Meaning of probability of standard distribution.

The Binominal distribution.

The normal distribution.

Divergence from normality – skewness, kurtosis

#### **UNIT – VI : Sampling Techniques**

Need for sampling – Criteria for good samples.

Application of sampling in Community.

Procedures of sampling and sampling designs errors.

Sampling variation and tests of significance.

#### **UNIT – VII : Health Indicator**

Importance of health Indicator.

Indicators of population, morbidity, mortality, health services.

Calculation of rates and ratios of health

#### **Recommended Books.**

*B.K. Mahajan & M. Gupta (1995) Text Book of Preventive & Social Medicine, 2002, 17th Edition  
Jaypee Br*

**B.Sc. Allied Health Sciences**  
**CARDIAC TECHNOLOGY**  
**SCHEME OF EXAMINATION 2017**

**SEMESTER-V**

		Hrs/Sem		Evaluation (Marks)					
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Cardiac Tech.Clinical-I Theory (U.E.)	60	-	20	-	80	-	100	5
2.	Cardiac Tech.Clinical-II- Theory (U.E.)	60		20	-	80	-	100	5
3.	Cardiac Tech.Practicals (U.E.)		180	-	20	-	60	80	5
4.	Cardiac Tech. CLINICALS & Viva.	-	180	-	20	-	60	80	5
5.	Medical Ethics& Research Methodology(IE)	60	-	20	-	60	-	80	4
<b>Total Credits</b>									<b>24</b>

Total No. of Hours-600 hours.

U.E.-University Examination

I.E-Internal Examination.

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**CARDIAC TECHNOLOGY****SYLLABUS**

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**SEMESTER – V**

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**1. CARDIAC TECHNOLOGY – CLINICAL – I****Course objective:**

This course will provide training in all aspects of instrumentation and recording techniques for electrocardiography, echocardiography, treadmill exercise stress testing, Holter monitoring and nuclear cardiology. At the end of the course, the student will be able to perform a 12 lead ECG, assist in treadmill exercise testing, assist in ultrasonography, perform echocardiography using colour Doppler and help in nuclear imaging under the supervision of a physician.

**UNIT – I**

1. Interpretation of Normal ECG and Basic abnormalities of ECG in RHD, IHD & CHD
2. Echo in rheumatic heart disease – Echo in mitral stenosis, mitral incompetence, aortic stenosis, aortic incompetence, pulmonary hypertension. Post AVR, post MVR. Prosthetic valve malfunction, LA clot.
3. Echo in congenital heart disease – Echo in ASD, VSD, PDA pulmonary stenosis, aortic stenosis, coarctation of aorta, TOF. Dextrocardia.
4. Echo in ischemic heart disease – Echo in acute myocardial infarction, old myocardial infarction and other ischemic heart disease related conditions, LV aneurysm

**UNIT – II**

5. Echo in other cardiovascular disease – Echo in various types of cardio myopathy infective endocarditis diseases of aorta, mitral valve prolapsed, myxoma and other cardiovascular diseases.
6. Assessment of Cardiac function – measurements of all cardiac chambers and assessment of cardiac function
7. Echo in pericardial disease – pericardial effusion, cardiac tamponade, constrictive pericarditis

## **2 & 3. CARDIAC TECHNOLOGY – CLINICAL – II**

### **UNIT – III**

8. Cardiac catheterisation laboratory – general details of cardiac catheterisation equipment, how to handle the machine, common problems one may come across and how to overcome it, radiation hazards
9. Materials used in the cathlab – all catheters, balloons, guide wires, pacemakers contrast material and other material used in the cardiac catheterisation laboratory and sterilization of all these materials
10. Right heart catheterisation – procedure, cath position, oxymetry at various levels, angios done and its interpretation
11. Left heart catheterisation – procedure, cath position, oxymetry at various levels, angios done and its interpretation

### **UNIT – IV**

12. Coronary angiogram

– Procedure, materials used, type and amount dye used, indications and contraindications, various pictures recorded in various angles and gross interpretation.

### **UNIT – V**

13. Peripheral angiogram – Procedure, indication and contraindication

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## **4. CARDIAC TECH. CLINICALS & VIVA**

### **5. MEDICAL ETHICS**

#### **COURSE CONTENT**

##### **1. Introduction to Ethics-**

- what is ethics
- what are values and norms
- Hippocratic oath

##### **2. Ethics of individual**

- Doctor patient relationship.
- right to be respected.
- Truth and confidentiality.
- Autonomy of decision
- The patient as a person

##### **3. Professional Ethics-**

- Code of conduct
- malpractice and negligence.
- contract and confidentiality.

##### **4. Research Ethics**

**B.Sc. Allied Health Sciences**  
**CARDIOLOGY TECHNOLOGY**  
**SCHEME OF EXAMINATION 2017**

**SEMESTER-VI**

		Hrs/Sem				Evaluation (Marks)			
S.No	Paper	L	P	Internal Assessment		University Exams/ Departments* Exams		Total	Credits
				T	P	T	P		
1.	Cardiac technology Applied. I- Theory (U.E)	60	-	20	-	80	-	100	5
2.	Cardiac Technology Applied.II - Theory(U.E)	60	-	20	-	80	-	100	5
3.	Cardiac Technology Clinical & Comprehensive Viva (U.E)		250	-	20	-	60	80	5
4.	Hospital Products, Promotion, Public Relations/ Physicians Office Management( I.E)	60	-	20	-	60	-	80	4
5.	Cardiac Life Support( I.E)	60	-	20	-	60	-	80	4
<b>Total Credits</b>									<b>23</b>

Total No. of Hours-500 hours.

U.E.-University Examination

I.E-Internal Examination.

## **CARDIAC TECHNOLOGY**

### **SYLLABUS**

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## **SEMESTER – VI**

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### **1. CARDIAC TECHNOLOGY - APPLIED. I**

#### **UNIT – I**

1. ECG in myocardial infarction- definition of myocardial infarction, diagnosis of myocardial infarction, ECG criteria for myocardial infarction, ECG in anterior wall, true posterior wall and sub endocardial infarction and RV infarction
2. ECG in rheumatic heart disease – definition of rheumatic heart disease, valvular involvement in rheumatic heart disease, ECG in mitral stenosis, mitral incompetence, aortic stenosis and aortic incompetenace
3. ECG in hypertension- definition of hypertension, how to record blood pressure, ECG in hypertension
4. ECG in congenital heart disease- common congenital heart disease ASD, VSD, PDA, pulmonary stenosis, aortic stenosis, coarctation of aorta, TOF, definition of all these conditions, ECG changes in all these conditions

#### **UNIT – II**

5. ECG in other conditions – ECG in various types of cardiomyopathy, myxoedema, pericardial effusion, acute pericardities and other vascular diseases. Bundle branch block, WPW syndrome, dextrocardia
6. Trans esophageal echocardiogram – indications, procedure, usefulness and complications one may encounter and its management
7. Stress Echo- procedure and indications
8. Peripheral Doppler – Procedure and usefulness of peripheral Doppler
9. Coronary angioplasty-procedure, materials used, complication one may encounter and how to manage it

#### **UNIT – III**

10. Peripheral angioplasty – materials used and procedure. Angioplasty of coarctation of aorta
11. Fetal echocardiogram – Procedure, basic interpretation
12. Contrast echocardiogram – procedure and usefulness of contrast echocardiogram

## **2. CARDIAC TECHNOLOGY - APPLIED. II**

### **UNIT – IV**

13. Myocardial contrast echo- Basic knowledge

14. Cardiac monitoring – definition, purpose of cardiac monitoring, how to Recognise various arrhythmias how to set up a intensive

Coronary care unit and usefulness of ICCU

15. Interpretation of TMT, report – criteria for TMT positive test contraindication for TMT conditions where TMT is not useful, complications that may occur in TMT room and its management

16. Use of defibrillator- indications, how to use the defibrillator,

17. Complications during the procedure and its management

Management of cardiac arrest – definition, causes external cardiac

Message, artificial respiration and other drugs and procedures used in the management of Cardiac arrest

Myocardial perfusion scan – procedures and usefulness of myocardial perfusion scan

Cardiac arrhythmias – brad arrhythmia and tachy arrhythmias and ECG diagnosis of all rhythm disturbances. Sinus arrhythmia, complete heart block

Electrolyte disturbances – ECG in hypokelema, hyperkelema etc.

Holter monitoring – procedure and usefulness

Valvoplasties – procedure, indications, complications and treatment of balloons, mitral valvuloplasty, balloon aortic valvuloplasty balloon

Pulmonary valvuloplasty and balloon tricuspid valvuloplasty.

### **UNIT – V**

10. Coil closure and device closure of PDA– procedure, indications and

Materials used for coil and device closure of PDA

11. Device closure of ASD – procedure, indications and materials used

For device closure of ASD

12. Device closure of VSD – procedure, indications and materials used

For device closure of VSD



#### **UNIT – IV**

13. Electrophysiological studies – basic knowledge of EP studies mapping and ablation
14. Oxymetry – handling of the instrument and usefulness of the instrument, normal and abnormal values.
15. Pressure recording – handling of the instrument and pressures in various chambers, normal and abnormal values

#### **UNIT – VI**

16. Temporary and permanent pacing – materials used, procedure, complications one may encounter and management. Implantable Cardioverter defibrillator devices
17. CD recording and storage- recording and storage of all the procedures over CD
18. Procedure during pregnancy- precautions to be followed.
19. Nuclear Cardiology – instrumentation, radiopharmaceuticals, patient imaging techniques.
20. Intravascular ultrasound.
21. O.C.T.

### **3. CARDIAC TECHNOLOGY CLINICAL & COMPREHENSIVE VIVA**

#### **(Cardiac Care Technology – Advanced)**

1. Cardiac monitoring – definition, purpose of cardiac monitoring, how to Recognise various arrhythmias how to set up a intensive coronary care unit and usefulness of ICCU
2. Interpretation of TMT, report – criteria for TMT positive test contraindication for TMT conditions where TMT is not useful, complications that may occur in TMT room and its management
3. Use of defibrillator – indications, how to use the defibrillator, complications during the procedure and its management
4. Management of cardiac arrest – definition, causes external cardiac massage, artificial respiration and other drugs and procedures used in the management of Cardiac arrest
5. Myocardial perfusion scan – procedures and usefulness of myocardial perfusion scan
6. Cardiac arrhythmias – bradyarrhythmia and tachy arrhythmias and ECG diagnosis of all rhythm disturbances. Sinus arrhythmia, complete heart block
7. Electrolyte disturbances – ECG in hypokalemia, hyperkalemia etc.
8. Holter monitoring – procedure and usefulness
9. Valvoplasties- procedure, indications, complications and treatment of balloons, mitral valvuloplasty, balloon aortic valvuloplasty balloon pulmonary valvuloplasty and balloon tricuspid valvuloplasty.
10. Coil closure and device closure of PDA – procedure, indications and materials used for coil and device closure of PDA
11. Device closure of ASD – procedure, indications and materials used for device closure of ASD
12. Device closure of VSD – procedure, indications and materials used for device closure of VSD
13. Electrophysiological studies – basic knowledge of EP studies mapping and ablation
14. Oxymetry – handling of the instrument and usefulness of the instrument, normal and abnormal values
15. Pressure recording- handling of the instrument and pressures in various chambers, normal and abnormal values
16. Temporary and permanent pacing – materials used, procedure, complications one may encounter and management. Implantable Cardioverter defibrillator devices
17. CD recording and storage- recording and storage of all procedures over CD
18. Procedure during pregnancy- precautions to be followed.
19. Nuclear Cardiology – instrumentation, radiopharmaceuticals, patient imaging techniques.

## **4. HOSPITAL PRODUCTS, PROMOTION, SALES & PUBLIC RELATIONS (OR) PHYSICIAN'S OFFICE MANAGEMENT (IE)**

### **UNIT I:**

- **An introduction to Marketing**

Role of marketing in Business management – Evolution and definition of marketing – Concepts of Marketing – Service vs. Products – Management of Service Management process.

- **Services Marketing**

Classification of services – Characteristics of services and their marketing implication – Selecting appropriate tools for marketing.

### **UNIT II:**

- **Component of Service Marketing**

Product Planning, Market research system – Market segmentation – Targeting – Positioning – Launching new service – Concept of product life cycle, Pricing, Setting the price – Economic Theory – Responding to price change, Physical Distribution, Major Aspects – Channels of distribution – Selection of channel, Promotion, Role of communication – Promotion mix – advertising (Media – budget – Cost effectiveness – (attributing to hospitals a human face – Good will – image building among major public) Sales promotion (techniques – Evaluation), Direct selling (Sales force – Evaluation), Physical Environment, Process, People

### **UNIT III:**

- **Analysing Markets and Buyer Behaviour**

Model of consumer behaviour – Factors influencing buyer behaviour – Buying decision process

- **Branding of a Hospital Facility**

Brand name and concept – Positioning hospitals – Developing and USP – Brand image – Image building – long term and short term activities.

### **UNIT IV:**

- **Other Marketing routes for Health Care Units**

Interpersonal communication – Print materials institutional marketing – seminars – conference

- **Marketing Strategies for Hospital**

Managing Differentiation – Service Quality – Productivity – Product support service.

**UNIT V:**

- **Evaluating and Controlling Market Performance**

Annual plan control (sales analysis – market share analysis – Marketing expense to sales analysis – Financial analysis), Profitability control, Efficiency control, Strategic control.

OR

**PHYSICIAN'S OFFICE MANAGEMENT**

**UNIT I. Outpatient section**

Registration of new cases, Registration of repeat cases, Patient record guide, Laboratory X – Ray reports & reports filing, Alpha index typing & Filing, O.P. Records coding (disease & indexing), O.P. records retrieval, O.P. Statistics

**UNIT II. Inpatient Section**

Admitting office procedure, Inpatient record removal & forwarding, Ward Census,

**UNIT III. Assembling & deficiency checks I.P. record coding & indexing,**

**UNIT IV. Discharge Analysis**

Incomplete record control, Completed record control, Medico legal procedures & issue of Medical certification, Record retention & destruction of O.P. & I. P. records,

**UNIT V. Miscellaneous**

Hospital reception, Secretarial practice, Library (Medical)

## **5. CARDIAC LIFE SUPPORT (IE)**

### **UNIT I. CARDIAC LIFE SUPPORT (part 1)**

- BLS
- The universal algorithm for adult ECC
- Ventricular fibrillation/Pulse less ventricular tachycardia 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
- Emergency Cardiac pacing
- AED
- Techniques for oxygenation and ventilation
- Disaster management\*

\* Amended Academic Council XIX meeting Revolution held on 30-10-2014 and Board of management held on 30-12-2014.



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