



Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)

B.Sc. ALLIED HEALTH SCIENCE

CARDIAC PERFUSION TECHNOLOGY

REGULATIONS AND SYLLABUS 2017

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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 31st 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 fulfillment 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:

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	-

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

- 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.
- 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.
- 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 Practicals 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 1/2hrs

I. Essay Questions (1×10)

10 Marks

II. Short Notes (8×5)

40 Marks

II. Short Answers (5×2)

10 Marks

Ist & IInd Semester alone

B. Theory

Max. Marks – 60 Duration: 2 1/2hrs

I. Essay Questions (2×10)

20 Marks

II. Short Notes (8×5)

40 Marks

IIIrd, IVth, Vth & VIth - Semester

C. Practical

I. Practical (Including Oral)

20 Marks

D. Continuous (Internal) Assessment

I. Theory 10 Marks

II. Practical 10 Marks

Internal Examination

Short Notes or Short Answers 8x5 = 40

IA = 10

Total 50

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.

Criteria to pass:

I and II SEMESTER

1.Theory – Minimum Pass - 40% .

2.Theory&Practical–40%ofthe aggregate(i.e)theory(60)+practical(20)=80, 40% of this (i.e) 32 is the minimum marks to pass.

III and VI SEMESTER

1.Theory –Minimum Pass - 40%,

2.Practical – Minimum Pass - 40%

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 2017-2018

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 branches)

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.

PERFUSION TECHNOLOGY
SCHEME OF EXAMINATION 2017-18
SEMESTER – III

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Applied Anatomy & Physiology related to Cardiac Perfusion Technology – Theory(UE)	60	-	20	-	60	-	80	4
2.	Applied Anatomy & Physiology related to Cardiac Perfusion Technology – Practical(IE)	-	120	-	20	-	60	80	4
3.	Applied Pathology, Haematology & Pharmacology related to Cardiac Perfusion Technology – Theory(UE)	60	-	20	-	60	-	80	4
4.	Applied Pathology, Haematology & Pharmacology related to Cardiac Perfusion Technology –Practical(IE)	-	120	-	20	-	60	80	4
5.	Basic Principles of Hospital Management(IE)	60	-	20	-	60*	-	80	4
6.	Comprehensive viva Applied Anatomy & Physiology related to Cardiac Perfusion(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

PERFUSION TECHNOLOGY
SCHEME OF EXAMINATION 2017-18
SEMESTER – IV

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Basics of Perfusion Technology – Paper-I – Theory(UE)	60	-	20	-	60	-	80	4
2.	Basics of Perfusion Technology – Paper-I – Practical(UE)	-	120	-	20	-	60	80	4
3.	Basics of Perfusion Technology – Paper-II – Theory(UE)	60	-	20	-	60	-	80	4
4.	Basics of Perfusion Technology – Paper-II – Practical(UE)	-	120	-	20	-	60	80	4
5.	Health Care Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Basics of Perfusion Technology comprehensive(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

PERFUSION TECHNOLOGY
SCHEME OF EXAMINATION 2017-18
SEMESTER – V

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Principles of Perfusion Technology – Paper-I Theory(UE)	60	-	20	-	60	-	80	4
2.	Principles of Perfusion Technology – Paper-I Practical(UE)	-	120	-	20	-	60	80	4
3.	Principles of Perfusion Technology – Paper-II Theory(UE)	60	-	20	-	60	-	80	4
4.	Principles of Perfusion Technology – Paper-II Practical(UE)	-	120	-	20	-	60	80	4
5.	Hospital Products, Promotion, Sales & Public relations (or)Physician’s Office Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Principles of Perfusion Technology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

PERFUSION TECHNOLOGY
SCHEME OF EXAMINATION 2017-18
SEMESTER – VI

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Perfusion Technology – Applied Theory(UE)	60	-	20	-	60	-	80	4
2.	Perfusion Technology – Applied Practical(UE)	-	120	-	20	-	60	80	4
3.	Perfusion Technology – Advanced Theory(UE)	60	-	20	-	60	-	80	4
4.	Perfusion Technology – Advanced Practical(UE)	-	120	-	20	-	60	80	4
5.	Trauma & Cardiac Life Support(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Perfusion Technology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

COMMON TO ALL BRANCHES
INTERNSHIP [VII & VIII SEMESTER]

Sl. No.	Programme	Hours Prescribed	University Examination			
			Project Evaluation	Viva	Total	Credits
1	Internship	675	-	-	-	15
2	Project	180	80	20	100	6
No Minimum for Passing			Total Credits			21

B.SC. ALLIED HEALTH SCIENCE 2017-2018

PERFUSION TECHNOLOGY

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)

MAIN SUBJECTS:

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)

B.SC. ALLIED HEALTH SCIENCE 2017-2018**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	3
5.	English[I.E.]	60	-	10	-	40	-	50	3
6.	Basics of Computers[I.E.]	30	30	10	-	40	-	50	3
Total									24

U.E University examination.

I.E Internal examination.

[These examinations shall be conducted by respective departments].

B.SC. ALLIED HEALTH SCIENCE 2017-2018

SYLLABUS

SEMESTER – 1

(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)

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

2. 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

3. Muscle physiology:

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

4. 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 (IE)

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 – ^{99m}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 Thaomas 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 read 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 precision, clarity and specificity

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 2017-2018

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)

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

B.SC. ALLIED HEALTH SCIENCE 2017-2018

SYLLABUS

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)

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.

PATHOLOGY – UNIVERSITY PRACTICAL EXAMINATION

(Common to all courses)

Duration – 2 Hrs

Maximum Marks – 20

EXPERIMENTS:-

I. URINE EXAMINATION:

(8 Marks)

- **Physical** - **2 Marks**
- **Chemical (Any one)** - **2 Marks**
 - a) **Test for Sugar**
 - b) **Test for Protein**
 - c) **Test Ketone bodies**
- **Microscopic Examination** - **4 Marks**

II. BLOOD EXAMINATION: (Any one of the following)

(8 Marks)

- **Blood grouping**
Bleeding time, clotting time
- **Hb Estimation & PCV**
- **Differential Count**
- **WBC Count**

III. SPOTTERS:

(4 Marks)

Any two instruments & 2 Charts

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-clauvulinic 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 artemisinins, 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.

PRACTICALS:- SPOTTERS / CHARTS

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, 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 & Wholesome 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. B D 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. dyvatham, Emerald Publishers (Approx. cost Rs. 150)

Microbiology

1. Prof C P 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. Internation publishing House Pvt, Ltd. New Delhi.

Community Medicine

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

PERFUSION TECHNOLOGY

SCHEME OF EXAMINATION 2017-18 BATCH

SEMESTER – III

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department *Exams		Total	Credits
				T	P	T	P		
1.	Applied Anatomy & Physiology related to Cardiac Perfusion Technology – Theory(UE)	60	-	20	-	60	-	80	4
2.	Applied Anatomy & Physiology related to Cardiac Perfusion Technology – Practical(IE)	-	120	-	20	-	60	80	4
3.	Applied Pathology, Hematology & Pharmacology related to Cardiac Perfusion Technology – Theory(UE)	60	-	20	-	60	-	80	4
4.	Applied Pathology, Hematology & Pharmacology related to Cardiac Perfusion Technology –Practical(IE)	-	120	-	20	-	60	80	4
5.	Basic Principles of Hospital Management(IE)	60	-	20	-	60*	-	80	4
6.	Comprehensive viva Applied Anatomy & Physiology related to Cardiac Perfusion(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B. SC. ALLIED HEALTH SCIENCES

PERFUSION TECHNOLOGY

SYLLABUS

SEMESTER – III

1. APPLIED ANATOMY & PHYSIOLOGY RELATED TO CARDIAC PERFUSION TECHNOLOGY – (UE)

UNIT I. Anatomy of Cardiovascular and respiratory system

1. Gross anatomy and structural features of heart and great vessels

- Location, size, surface features, pericardium and valves, Right atrium – structural features, venous area, septum and a trial appendage. Left atrium – structural features venous area, septum and appendage.
 - Right ventricle – structural features inflow and outflow characteristics. Left ventricle – structural features inflow and outflow characteristics. Valves – location, structure and functions of each valve. Blood supply of Heart in brief: Coronary arteries. Innervations sympathetic and parasympathetic sensory. Lymphatic drainage of heart in brief.
 - GREAT VESSELS: Structure of blood vessels and its organization. Example: Aorta, pulmonary artery, pulmonary veins.
- ##### **2. Anatomy of Respiratory system** – Organization of the respiratory system, Gross structure and interior features of nose, nasal cavity, Gross structure and interior features of pharynx and larynx, Gross structure and features of trachea and bronchial tree, Gross structure and histology of lungs, Pulmonary circulation – pulmonary arteries, pulmonary veins and bronchial arteries, Nerve supply to respiratory system.

UNIT II. Anatomy of Nervous system, Renal system and Liver

- Brief introduction of nervous system, Brain – location, gross features, parts, functional areas, cerebral blood circulation and coverings. Spinal cord – gross features, extent, blood supply and coverings. Peripheral nervous system – organization and structure of a typical spinal nerve.
- Organization of renal system, Kidneys: location, gross features, structure, blood supply and nerve supply, Ureters and urinary bladder – location, gross features and structure

UNIT III. Physiology of cardiovascular system – INTRODUCTION – Functions of CVS and blood circulation. Tissue perfusion and microcirculation. **Cardiac cycle** – Cardiac output – definition, measurements, regulation and control, Stroke volume, Arterial pressure and its regulation, Peripheral resistance, Venous return, Heart rate, Cardiac cycle with special reference to waveforms of pressure tracing, Heart as a pump – physical characteristics of atria, ventricles and valves, Mechanism of contraction, Description and organization of pacemaker and conduction

system, Specialized conduction tissues, Sinus node, Inter nodal tracts, Atrioventricular node, His bundle, Bundle branches, Nodal electricity, Nervous control of heart rate, Cardiovascular regulatory mechanism. Vasodilation, Auto regulation (myogenic theory), Vasodilator metabolites, kinins and vasoconstriction. Circulatory vasoconstrictors, Neural and hormonal regulatory mechanism, Cardio inhibitory center, Baro and chemo receptors, Movement of fluids and dissolved solutes in the body, Control of stroke volume & cardiac out put, Coronary circulation, renal circulation, Cerebral circulation, pulmonary circulation, and cutaneous circulation, Coordinate cardiovascular responses to posture, valsalva manoeuvre & exercise. Basics of electro cardio gram – Definition, electrical condition, atrial activation, atrial complex, ventricular activation, ventricular complex and normal values.

UNIT IV. Physiology of Respiratory system – Upper airway – nose, pharynx, larynx, Lower airway – trachea bronchial tree, The mucus blanket – mucus and cilia, Lung parenchyma – alveoli, gaseous exchange, alveolar macrophages and surfactant. Lung – thorax relationship, Physics of ventilation – principles of elasticity compliance and airway resistance. Mechanism and regulation of respiration, Principles of gaseous exchange, Pulmonary function studies, lung volumes and capacities by use of spirometry, Screening pulmonary function tests, Concept of physiological shunt and its effect, Brief concept of artificial ventilation

UNIT V. Physiology of Renal system, Nervous system and Liver – Organization and functions of renal system, Renal circulation and glomerular filtration rate, Mechanism of urine formation and excretion, Renal function tests – Functions of brain, Reflexes and their general properties, Physiological basis of consciousness and sleep, Briefly organization and functions of autonomic nervous system

2. APPLIED ANATOMY & PHYSIOLOGY RELATED TO CARDIAC PERFUSION TECHNOLOGY – (UE)

1. Model of heart – chambers, valves and coronary arteries
2. Model of respiratory tract – pharynx, larynx, trachea and bronchial tree
3. Systemic circulation
4. Pulmonary circulation
5. Nervous system, renal system and liver
6. Cardiac cycle
7. ECG

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts / stations 5 (5x4=20)

Viva – 20

3. APPLIED PATHOLOGY, HEMATOLOGY & PHARMACOLOGY RELATED TO CARDIAC PERFUSION TECHNOLOGY – (UE)

UNIT I. Applied Pathology of Cardiovascular system

Atherosclerosis – Definition, risk factors, briefly pathogenesis and morphology, clinical significance and prevention, Hypertension – Definition, types and briefly pathogenesis and effects of hypertension, Pathophysiology of heart failure Ischaemic heart diseases – definition, types, briefly Pathophysiology, Pathology and complications, Valvular heart diseases – causes, pathology and complications Congenital heart diseases briefly about pathogenesis and basic effects.

UNIT II. Applied Pathology of Respiratory system and Renal system

Chronic obstructive airway diseases – definition and types Briefly concept about obstructive versus restrictive pulmonary diseases Pulmonary congestion and edema, Pleural effusion – causes, effects and diagnosis, Clinical manifestation of renal diseases, Briefly causes, mechanism, effects and laboratory diagnosis of acute renal failure and chronic renal failure. Briefly glomerulonephritis and pyelonephritis, Brief concept about obstructive uropathy.

UNIT III. HAEMATOLOGY –

Components of blood – their normal values and functions, blood groups and briefly rocedures involved in blood transfusion, Coagulation factors and coagulation cascade, Risks of and alternatives to blood and blood product transfusion, Anaemia – definition, morphological types and diagnosis of anemia, brief concept about haemolyticaemia and polycythaemia, Leukocyte disorders – briefly leukaemia, leukocytosis, agranulocytosis etc., Bleeding disorders – definition, classification, causes and effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

UNIT IV. Applied Pharmacology related to Perfusion technology – Part I

- **Terminology – Classification of drugs** – Principles of drug administration and routes of administration, absorption, distribution, metabolism, excretion of drugs, factors influencing drug action, dosage and factors modifying it. Drug allergy and toxicity, mechanism of drug action (various ways in which they act).
- **Definition, actions, Indications, contraindications, adverse reactions of the following;** Drugs acting on autonomous nervous system; stimulating and inhibiting, cholinergics and adrenergics. Drugs acting at neuromuscular junction and other muscle relaxants.
- **Cardiovascular drugs – enumerate the mode of action, side effects and therapeutic uses of the following drugs** – Antihypertensives example: beta adrenergic antagonists, alpha adrenergic antagonists etc. Antiarrhythmic drugs, Cardiac glycosides, Sympathetic and nonsympathetic inotropic agents, Coronary vasodilators, Antianginal and anti failure agents Drugs used in haemostasis – anticoagulants, Thromobolytics and antithrombolytics, Cardioplegic drugs – history, principles and types of cardioplagia, Primary solutions – history, principles and types, Drugs used in the treatment of shock
- **Antihistamines and antiemetics** – Classification, mechanism of action, adverse effects, preparations, dose, routes and administration.

- **Analgesics** – Definition and classification, Routes of administration, dose, frequency of administration, side effects and management of non opioid and opioid analgesics.
- **Drugs acting on CNS:** Alcohol, Sedatives, Hypnotics, Anticonvulsants, Psychotherapeutics, Stimulants.
- **Anaesthetic agents** – Definition and classification of general anaesthetics Pharmacokinetics and pharmacodynamics of general anaesthetics, inhaled anaesthetic agents etc. Local anaesthetics – classification mechanism of action, duration and methods to prolongation of duration of action of local anaesthetics. Preparations, dose and routes of administration, side effects and management.
- **Inhalation gases,** preparations, classification mechanism of action.

UNIT V: Applied Pharmacology related to Perfusion technology – Part II

- **Pharmacotherapy of respiratory disorders** – Introduction – Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone
- Mucokinetic and mucolytic agents, Use of bland aerosols in respiratory care
- Pharmacotherapy of bronchial asthma, Classification, mechanism of action, adverse effects and complications. Preparation, dose and routes of administration
- **Endocrine pharmacology:** Thyroid hormones, glucocorticoids, anabolic steroids, calcitonin, insulin and oral hypoglycaemic agents.
- **Chemotherapy of infections-** Definition, classification and mechanism of action of antimicrobial agents and chemoprophylaxis Classification, preparation, dose, routes of administration and adverse effects of penicillin, cephalosporins, antitubercular drugs etc.
- **Corticosteroids** – classification, mechanism of action, adverse effects and complications. Preparation, dose and routes of administration
- **Pharmacological protection of organs during cardio pulmonary bypass**
- **Miscellaneous** IV fluids – various preparations and their usage
- Immunomodulatory agents
- Newer drugs included in perfusion technology
- Drugs used in metabolic and electrolyte imbalance

4. APPLIED PATHOLOGY, HEMATOLOGY & PHARMACOLOGY RELATED TO CARDIAC PERFUSION TECHNOLOGY – (UE)

1. Cardiac pathology
2. Pathology of respiratory and renal system
3. Hematology
4. Cardiovascular drugs
5. Anesthetic agents

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts / stations 5 (5x4=20)

Viva – 20

5. BASIC PRINCIPLES OF HOSPITAL MANAGEMENT

(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.

**6. COMPREHENSIVE VIVA APPLIED ANATOMY & PHYSIOLOGY RELATED TO
CARDIAC PERFUSION : (IE)**

PERFUSION TECHNOLOGY

SCHEME OF EXAMINATION 2017-18 BATCH

SEMESTER – IV

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department*		Total	Credits
				T	P	T	P		
1.	Basics of Perfusion Technology – Paper-I – Theory(UE)	60	-	20	-	60	-	80	4
2.	Basics of Perfusion Technology – Paper-I – Practical(UE)	-	120	-	20	-	60	80	4
3.	Basics of Perfusion Technology – Paper-II – Theory(UE)	60	-	20	-	60	-	80	4
4.	Basics of Perfusion Technology – Paper-II – Practical(UE)	-	120	-	20	-	60	80	4
5.	Health Care Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Basics of Perfusion Technology comprehensive(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

PERFUSION TECHNOLOGY

SEMESTER – IV

1. BASICS OF PERFUSION TECHNOLOGY – PAPER I – THEORY(UE)

UNIT I: History of Cardiopulmonary bypass – Origin of CPB, CPB beginning efforts, Scientific discoveries in development of extracorporeal circulation, Autogenous lung for CPB, Controlled cross-circulation, Early oxygenators and developments.

UNIT II: Mechanics, components of Heart and lung machine and mechanical pumps for extracorporeal circulation- Introduction, Displacement pump, Roller pumps – working principle – fluid dynamics – occlusion, Non-occlusive roller pumps – working principle, Rotary pumps, Centrifugal pumps – working principles – centrifugal force – heat generation – flow meters – fluid dynamics, Diagonal pumps – working principle

UNIT III: Oxygenation and heat exchange in extracorporeal circulation- Oxygenator principles, Oxygenator design, bubble oxygenator – flow through an oxygenator – determinants of the pO₂ and pO₂ in gas and bleed – gas diffusion, Membrane oxygenators – membrane types – operation and control of membrane oxygenators Quantification of oxygenator performance, Coated oxygenators, Heat exchangers

Introduction – modes of heat transfer – heat transfer theory – materials in heat – exchange devices – heat exchanger performance evaluation

UNIT IV: Conduits and filters for extracorporeal circulation – Introduction Tubing, Cannulas, Filters, Arterial line filters – cardiotomy filters – transfusion filters – gas filters – leukocyte – depleting filters

UNIT V: Assembling and monitoring in extracorporeal circulation – Introduction, Preparation for extracorporeal circuit assemble, assembling the extracorporeal circuit, Monitoring, Temperature monitoring – blood pressure monitoring – flow monitoring – monitoring blood variables, Perfusion circuit safety devices.

2. BASICS OF PERFUSION TECHNOLOGY – PAPER I – PRACTICAL (UE)

1. History of CPB
2. Components of heart lung machine
3. Roller pumps, Centrifugal pumps, diagonal pumps
4. Oxygenators
5. Tubings

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts/stations 5 (5x4=20)

Viva-20

3. BASICS OF PERFUSION TECHNOLOGY – PAPER II – (UE)

UNIT I: Conduct of CPB-Technique of cannulation, Ascending aortic cannulation – right atriocavalcannulation, Special operative cannulation consideration – left ventricular decompression – complications of cannulation, Initiation and maintenance of CPB, Monitoring – clinical observations – acute complications – blood-gas analysis – oxygenation – blood pressure – anticoagulation – potassium – de-airing procedures, Termination of CPB, Preparing heart for CPB weaning – preparing the lungs for CPB weaning preparing the patient for CPB weaning – pharmacologic considerations – choosing inotropic/vasodilator drug therapies – failure to wean from CPB

UNIT II: Pharmacokinetics and pharmacodynamics during CPB-Basic principles of pharmacokinetics and pharmacodynamics, Determinants of drug concentration in plasma – drug elimination, Theoretical effects of hypothermia on pharmacokinetics and pharmacodynamics, Theoretical effects of CPB on pharmacokinetics, Factors determining free drug concentration during cardiac surgery

UNIT III: Hemostasis and CPB – Anticoagulation during bypass, Heparin pharmacokinetics and pharmacodynamics, Heparin activity tests, Heparin level, Heparin administration protocol, Heparin induced thrombocytopenia, Reversal of heparin anticoagulation, Adverse reactions to Protamine – Protamine dose and administration – heparin rebound, Effect of CPB on Hemostasis, Abnormal bleeding after CPB, Pharmacologic prophylaxis of bleeding.

UNIT IV: Central nervous system, respiratory, renal and hepatic system: responses to CPB-Incidence of neurologic and neuropsychologic dysfunction following cardiac surgery, Central nervous system monitoring, Factors affecting cerebral blood flow during CPB, Factors increasing risk of neurologic dysfunction following cardiac surgery, Pharmacologic strategies for cerebral protection during CPB, Expected respiratory changes after cardiac surgery, CPB induced Hemodilution and postoperative lung function, Pump lung (postperfusion lung syndrome), Possible mediators of lung injury associated with CPB, Renal consequences of CPB, Renal function during bypass, Renal function after bypass, Prevention of renal failure.

UNIT V: The immunological system and endocrine system: effects of SPB-Pathophysiologic changes in the immune system and inflammatory responses during CPB, Infection in the cardiac surgery patient: risk factors and prevention, Human immunodeficiency virus and CPB, Pituitary gland function during CB, Pancreatic function during CPB, Adrenal gland function during CPB, The stress response, Parathyroid and thyroid function during CPB

4. BASICS OF PERFUSION TECHNOLOGY – PAPER II (UE)

6. Conduct of CPB
7. Assembling
8. Monitoring
9. Filters
10. Cannulation

Exam pattern (60 marks)

Spotters-10 (10x2=20)

Charts/stations 5 (5x4=20)

Viva-20

5. HEALTH CARE MANAGEMENT

UNIT I: Concept of Health Care and Health Policy

Health in Medical Care, Indigenous systems of Health Care & their relevance, Framework for Health Policy development.

UNIT II: Health Organisation

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

UNIT III: Health Policy and National Health Programme

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

UNIT IV: Health Economics – Fundamentals of Economics

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

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

UNIT V: Methods & Techniques of Economic Evaluation of Health Program

Cost Benefit & Cost Effective Methods.

- **Household & Health**

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

- **Health Insurance.**

6. COMPREHENSIVE VIVA – 180 HRS
CLINICALS IN BASICS OF PERFUSION TECHNOLOGY COMPREHENSIVE VIVA :
(IE)

PERFUSION TECHNOLOGY

SCHEME OF EXAMINATION 2017-18 BATCH

SEMESTER – V

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department *Exams		Total	Credits
				T	P	T	P		
1.	Principles of Perfusion Technology – Paper-I Theory(UE)	60	-	20	-	60	-	80	4
2.	Principles of Perfusion Technology – Paper-I Practical(UE)	-	120	-	20	-	60	80	4
3.	Principles of Perfusion Technology – Paper-II Theory(UE)	60	-	20	-	60	-	80	4
4.	Principles of Perfusion Technology – Paper-II Practical(UE)	-	120	-	20	-	60	80	4
5.	Hospital Products, Promotion, Sales & Public relations (or)Physician’s Office Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Principles of Perfusion Technology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

SYLLABUS

SEMESTER – V

PERFUSION TECHNOLOGY

1. PRINCIPLES OF PERFUSION TECHNOLOGY – PAPER I THEORY (UE)

UNIT I: Circuits and tubing - Design consideration, Designing the circuit, Circuit components Tubing characteristics, Types of tubing

UNIT II: Hypothermia - Introduction, History of the development of clinical hypothermia, rationale for hypothermia during cardiac surgery, Adverse effects of hypothermia, Techniques to induce hypothermia for cardiac surgery, Rewarming, Temperature monitoring sites

UNIT III: Priming – Introduction, History, Hemodilution, rheology, Osmometry, Crystalloids Colloids, Plasma expanders, Oxygen carriers

UNIT IV: Blood gases – Hemoglobin – oxygen effect, Hemoglobin oxygen dissociation, curve, P50 Oxygen calculations, Buffer systems, acidosis, Alkalosis, Shunting, Corrective actions, Alpha stat and pH stat

UNIT V: Anticoagulation – Coagulation function test during CPB, Anticoagulation protocols during CPB, Heparin, Protamine sulphate, Platelet aggregation and prostacyclin therapy during CPB

2. PRINCIPLES OF PERFUSION TECHNOLOGY – PAPER I PRACTICAL (UE)

1. Circuits
2. Hypothermia
3. Priming
4. Blood gases
5. Anti coagulation

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts/stations 5 (5x4=20)

Viva – 20

3. PRINCIPLES OF PERFUSION TECHNOLOGY – PAPER II THEORY (UE)

UNIT I: Myocardial protection – Myocardial muscle, Cardioplegia components, Action of ingredients of cardioplegia solution, Oxygen free radicals, Cardioplegia delivery system, antegrade and retrograde cardioplegia, Problems preventing arrest, Cold vs warm cardioplegia, cardioplegiavs intermittent cross clamp, Reperfusion of myocardium, Complication of cardioplegia

UNIT II: Pulsatile perfusion – Introduction, Theories of physiology of pulsatile perfusion, Hemodynamic effects of pulsatile perfusion, Metabolic effects of pulsatile perfusion, Clinical use of pulsatile perfusion system, Hematological effects of pulsatile perfusion,

UNIT III: Microemboli – Gaseous microemboli, Gaseous microemboli from the pump oxygenator system, Gaseous microemboli originating in the heart and pulmonary veins, Particulate microemboli, Foreign material emboli, Blood derived emboli, Functional change associated with embolic events

UNIT IV: Blood conservation during CPB – Introduction, Risks associated with blood transfusion, Blood conservation techniques, Autologous transfusion, Isovolemic Hemodilution Pharmacologic interventions to decrease blood loss, Hemoconcentration and ultrafiltration devices, Cell salvage devices, Plasma sequestration techniques

UNIT V: Religious objections to blood transfusion – Historical aspects, Legal aspects Medical and surgical options, Jehovah's witness

4. PRINCIPLES OF PERFUSION TECHNOLOGY – PAPER II PRACTICAL (UE)

1. Myocardial protection
2. Pulsatile perfusion
3. Micro emboli
4. Blood conservation
5. Religious objections

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts/stations 5 (5x4=20)

Viva – 20

5. HOSPITAL PRODUCTS, PROMOTION, SALES AND PUBLIC RELATIONS (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:**

Unit III:

- **Analysing Markets and Buyer Behaviour**

Model of consumer behavior – Factors influencing buyer behavior – 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.

- **One case study related to Hospital Marketing**

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)

6. COMPREHENSIVE VIVA – 180 HRS

**CLINICALS IN PRINCIPLES OF PERFUSION TECHNOLOGY : COMPREHENSIVE
VIVA (IE)**

PERFUSION TECHNOLOGY

SCHEME OF EXAMINATION 2017-18 BATCH

SEMESTER – VI

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department *Exams		Total	Credits
				T	P	T	P		
1.	Perfusion Technology – Applied Theory(UE)	60	-	20	-	60	-	80	4
2.	Perfusion Technology – Applied Practical(UE)	-	120	-	20	-	60	80	4
3.	Perfusion Technology – Advanced Theory(UE)	60	-	20	-	60	-	80	4
4.	Perfusion Technology – Advanced Practical(UE)	-	120	-	20	-	60	80	4
5.	Trauma & Cardiac Life Support(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Perfusion Technology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5

Total No. of Hours – 600 Hours

Total No. of Credits-25

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

PERFUSION TECHNOLOGY

SYLLABUS

SEMESTER – VI

1. PERFUSION TECHNOLOGY – APPLIED THEORY (UE)

UNIT I: Pediatric CPB-Introduction, Preparation for CPB, Prime/Hemodilution, Monitoring Anticoagulation, Cannulation, Conduct of CPB, Maintenance and termination of CPB

UNIT II: Thoracic aortic surgery and intra cranial surgery with CPB-Thoracic aortic surgery, Ascending aorta – cannulation – CPB management – the aortic arch – CPB management – descending and thoraco-abdominal aorta – CPB management, Intra cranial surgery, Introduction – technique – Hemostasis and coagulation

UNIT III: Pregnancy, chest trauma and emergency CPB-Pregnancy and CPB, Introduction – pre operative considerations – conduct of perfusion in the gravid patients – selection of cardiovascular drugs and therapeutics in the gravid patients – effects of cardiovascular drugs during pregnancy and CPB, chest trauma and emergency CPB, Cardiac wounds – aortic wounds – major airway injuries

UNIT IV: Non Cardiac surgical applications of CPB-Introduction, Anesthetic considerations, Surgical considerations, Complications, CPB with profound hypothermia and circulatory arrest, Use in neuro surgery, Use in urologic surgery CPB without circulatory arrest for thoracic procedures, Pulmonary, embolectomy, Isolated left heart bypass.

UNIT V: Safety during CPB-Bypass safety, Organizational aspects, Accidents, Coagulopathies, Mechanical and electrical failures, Perfusion management, Perfusion systems, Safety for the perfusionist and surgical team

2. PERFUSION TECHNOLOGY APPLIED – PRACTICAL (UE)

1. Pediatric considerations
2. Non cardiac surgical applications
3. CPB on Thoracic aortic surgery
4. CPB considerations in pregnancy patients
5. Perfusion related accidents

Exam pattern (60 marks)

Spotters – 10 (10x2=20)

Charts/stations 5 (5x4=20)

Viva-20

3. PERFUSION TECHNOLOGY – ADVANCED (UE) – THEORY

UNIT I: Ventricular assist devices-Principles of ventricular assistance, Indications for ventricular assistance, Device selection, Assessment of myocardial recovery, Complications of ventricular assist devices, Future directions

UNIT II: Intra aortic balloon pump-History, IABP physiological considerations, Indications, Contraindications, Placement, alternative access routes, IABP management, Risks factors, Weaning from IABP support.

UNIT III: Transplantation-Heart, Heart and lung, Liver

UNIT IV: Extracorporeal membrane oxygenation-History and development Selection criteria, ECMO complications, ECMO for primary cardiac failure Financial considerations, Prospects for the future

UNIT V: Medical legal aspects of CPB-Introduction, Tort liability, Negligence, Vicarious liability, strict liability, Avoid litigation

4. PERFUSION TECHNOLOGY – ADVANCED – PRACTICAL (UE)

1. Ventricular assist devices
2. IABP
3. Perfusion considerations during heart, lung and liver transplantations
4. ECMO
5. Medical legal aspects of CPB

Exam pattern (60 marks)

Spotters-10 (10x2=20)

Charts/stations 5(5x4=20)

Viva-20

5. TRAUMA LIFE & CARDIAC LIFE SUPPORT

UNIT I. TRAUMA LIFE (Part 1)

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

UNIT II. TRAUMA LIFE (Part 2)

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

UNIT 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

6. COMPREHENSIVE VIVA – 180 HRS

CLINICALS IN PERFUSION TECHNOLOGY : COMPREHENSIVE VIVA (IE)

ALLIED HEALTH SCIENCE

*INTERNSHIP
PROGRAMME*

ALLIED HEALTH SCIENCE

INTERNSHIP

Regulation for Internship

Internship is an important part of training wherein an Allied Health Science Graduate acquires skills, and applies his knowledge gained during his course of study.

Objectives:

1. To Facilitate Reinforcement of Training.
2. To Develop Professionalism, Communication and Team Building skills.
3. To help in understating of ethical Practices like
 - Rights and dignity of patients
 - Ethical Conduct and professional obligations to colleagues, patients, families and community

The Internship is compulsory for all the candidates. It shall commence after the students have completed and passed all academic and clinical requirements.

The internship shall be for a duration of one year.

The degree shall be awarded after satisfactory completion of internship.

EVALUATION OF INTERNEES

Formative and Summative evaluation are carried out. A **Log Book** is maintained by all internees. No Marks are allotted. Satisfactory completion of Log Book is essential for completion of internship.

Day to day assessment of the internees during the internship posting should be done (Log Book).

Summative evaluation is based on observation of the supervisors of different department and their records in the log books. Based on the formative and summative evaluation the head of department shall issue certificate of satisfactory completion of training, following which the university shall award the degree.

During internship a project is allocated to each intern by the respective Heads of departments. The project work is marked for 100 (including viva).

Six credits are given for the project

30 hours per credit

Total 180 hours

The Project is done for a Maximum duration of 6 months.

Internship credits

The internship is given 15 Credits. (i.e.) 45 hrs/Credit. A Total of 675 hours.

After Undergoing internship for a period of Six months, each Department shall conduct an **internal evaluation** of the student to assess the skills developed and progress of the student before issuing the certificate of completeness.

The duration of the posting and skill acquisition in various technology courses are attached.

Number of Working days for interns:-

All Sundays are holidays.

On Government holidays duties are allotted on turns to the interns. In cases of leave or absence extension of posting shall be given which is done at the discretion of Head of Department.

COMMON TO ALL BRANCHES

INTERNSHIP [VII & VIII SEMESTER]

Sl. No.	Programme	Hours Prescribed	University Examination			
			Project Evaluation	Viva	Total	Credits
1	Internship	675	-	-	-	15
2	Project	180	80	20	100	6
No Minimum for Passing		Total Credits		21		

PERFUSION TECHNOLOGY

Duration of Postings

Theatre and ICU postings throughout the year

Patient assessment

- To know the exact pathology and the type of surgery that the patient needs
- Assess the patient's pre-operative neural, renal and hepatic functions

Preparation for the case

- Deciding the appropriate circuit to put the patient on bypass
- Assembling the circuit prior to connecting it to the patient
- Priming the circuit
- Connecting it to the patient and assisting the conduction of bypass

Conduction of bypass

- Conducting bypass beginning with simple cases three months prior to the completion of internship

Follow-up

- Follow up of the post operative patients in the ICU to learn about the complications of CPB and taking necessary steps to manage or prevent them

Other duties

- IABP management

Night duties

- Round-the-clock duties on turns in case of IABP
- Call duties to attend to emergencies
