



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
REGULATIONS AND SYLLABUS - 2021

BLOOD BANK TECHNOLOGY

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Regulations for B.Sc. (Allied Health Science) Course: 2021

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 .

3. Age limit for admission

A candidate should have completed the age of 17 years as on 31^s 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 within 6 months of last date of joining the course, through the Head of the Institution.

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:

GRADE PATTERN (CBCS)		
Letter Grade	Grade Points	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

- 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	} I & II SEMESTER alone
III. Short Answers (5*2)	10 Marks	
B. Theory	Max. Marks – 60	
I. Essay Question (2*10)	20 Symbols	} III, IV, V & VI SEMESTER
II. Short Notes (8*5)	40 Marks	
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	8×5 = 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%of the 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 retotaling.

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 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									24

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – III

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Hematology – Complete hemogram, Erythropoiesis, Leucopoiesis, Anaemia (UE).	60	-	20	-	60	-	80	4
2.	Hematology – Practical I (UE).	-	120	-	20	-	60	80	4
3.	History of blood transfusion, Blood Donation & Donor Management (UE)	60	-	20	-	60	-	80	4
4.	Blood donaion – Practical II (UE)	-	120	-	20	-	60	80	4
5.	Basic Principles of Hospital Management(IE)	60	-	20	-	60*	-	80	4
6.	Hematology: Comprehensive Viva (IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – IV

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Immuno hematology – General immunology – Theory(UE)	60	-	20	-	60	-	80	4
2.	Practical I (UE)	-	120	-	20	-	60	80	4
3.	Microbiology & Biochemistry – Theory(UE)	60	-	20	-	60	-	80	4
4.	Practical II (IE)	-	120	-	20	-	60	80	4
5.	Health Care Management(IE)	60	-	20	-	60*	-	80	4
6.	General Immuno hematology & General immunology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – V

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Organisation of Blood bank, Blood collection, Blood components.– Theory(UE)	60	-	20	-	60	-	80	4
2.	Practical I (UE)	-	120	-	20	-	60	80	4
3.	Testing for Transfusion Transmitted diseases, Transfusion therapy. Theory(UE)	60	-	20	-	60	-	80	4
4.	Practical II (UE)	-	120	-	20	-	60	80	4
5.	Hospital Products, Promotion, Sales & Public relation (or) Physician's Office Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in General Bacteriology, Immunology, Virology and Mycology : comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – VI

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Applications of Blood group – Population Genetics, Forensic Medicine & Therapeutic transfusion (UE)	60	-	20	-	60	-	80	4
2.	Blood bank Equipments & operation Practical I (UE)	-	120	-	20	-	60	80	4
3.	Transfusion Medicine – Bone marrow transplantation, Peripheral stem cells, Cord stem cells, Cord blood banking & Quality Control (QC) Management and Documentation Theory(UE)	60	-	20	-	60	-	80	4
4.	Blood bank Equipments & operation Practical II (UE)	-	120	-	20	-	60	80	4
5.	Trauma & Cardiac Life Support(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Clinical Chemistry: comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

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 2021
BLOOD BANK 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 are 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
BLOOD BANK TECHNOLOGY 2021
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
BLOOD BANK TECHNOLOGY 2021

SYLLABUS

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)

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 oesophagus, 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, Glucagon's – 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, neuroglia 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 Amino acids with examples
- Haemoglobin structure, Functions of haemoglobin, haemoglobin derivatives, Abnormal haemoglobin
- **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: Bio potential Recording Systems

Introduction to bioelectric potential – Electrodes and surfaces – Bio potential amplifier – Frequency ranges of various bio potential 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 Thomas S. Curry III, M.D., Robert C Murray, Jr. Ph.D., 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
BLOOD BANK TECHNOLOGY 2021**

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
BLOOD BANK TECHNOLOGY 2021**

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, Tumours And Tumour-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-cefepime, 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, ND 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 wellbeing, 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. B D Chaurasia: Genera; 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 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

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – III

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Hematology – Complete hemogram, Erythropoiesis, Leucopoiesis, Anaemia. Theory(UE)	60	-	20	-	60	-	80	4
2.	Hematology – Practical I (UE)	-	120	-	20	-	60	80	4
3.	History of blood transfusion, Blood Donation & Donor Management– Theory(UE)	60	-	20	-	60	-	80	4
4.	Blood donation – Practical II (UE)	-	120	-	20	-	60	80	4
5.	Basic Principles of Hospital Management(IE)	60	-	20	-	60*	-	80	4
6.	Hematology: 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 SCIENCE

BLOOD BANK TECHNOLOGY

SYLLABUS

SEMESTER – III

Paper - I

1.Hematology – Theory(UE)

Unit I: Collection of blood samples, types of anticoagulants.

Unit II: Complete hemogram, Different methods of haemoglobin screening/estimation: Copper sulphate, hematology analyzers, Sahli's Cyanmethemoglobin and Hemo-Q methods, Red cell indices. Normal erythropoiesis, Leucopoiesis, Formation and function of platelets.

Unit III: Classification of anaemia, their laboratory diagnosis, Hemoglobinopathy: Beta Thalassemia and Sickle cell disease, G6PD deficiency, polycythemia.

Unit IV: Autoimmune haemolytic anaemia, classification, diagnosis, specificity of autoantibodies.

Unit V: Coagulation Mechanism, Hemostasis, laboratory tests for coagulation, Hemophilia A & B, Platelet disorders.

2. Hematology (Practical I)

- 1) ABO cell and serum grouping by tube method.
- 2) Rh typing by saline, enzyme and albumin methods.
- 3) Routine major and minor cross-matching.
- 4) Rh typing by indirect antiglobulin method.
- 5) Hemoglobin estimated by Cyanmethemoglobin method.
- 6) Hb estimation on Hematology Analyzer.
- 7) Total RBC and WBC count.
- 8) WBC differential count and examination of blood smear for red cell abnormalities.
- 9) Platelet count.
- 10) Reticulocyte count.
- 11) Hb electrophoresis.
- 12) Sickling and solubility tests.

3. History of Blood Transfusion, Blood donation & Donor Management -Paper II

Unit I: History of Blood Transfusion: The history of blood transfusion originated with William Harvey's discovery of blood circulation in 1628. The earliest known blood Transfusion occurred in 1665 and the first human body transfusion was performed by Dr. Philip Syng Physick in 1795. The First Blood Bank was established in Leningrad in 1932.

Technology making the transfusion of allogenic blood products feasible include Karl Landsteiner's landmark identification of human blood groups A, B & O in 1901 and AB in 1902. In 1939 – 1940, The Rhesus (Rh) blood group was discovered.

Fresh whole blood transfusion has long been thought of as the Criterian standard for transfusion, but the advent of whole blood fractionation technique provided a means more efficient use of various components (i.e.) packed red blood cells, fresh frozen plasma, individual factor concentration, Platelet concentration.

Unit II:

- Donor Motivation, Motivational Techniques, Social awareness, Preparation of IEC Materials. Blood donation Motivating factors for donation.
- Types of blood donors, Donor selection.
- Donor questionnaire and interview: Eligibility and deferral criteria, medical interview and medical examination.
- Pre donation Investigations – haemoglobin estimation & Blood grouping

Unit III:

- Equipments & Reagents used in screening, investigations.
- Managing rejected blood donors, technique for conversion of first time donor into regular voluntary donor, donor felicitation.
- Donor recruitment & Retention.
- Pre donation & Post donation donor counselling.

Unit IV:

- Medico-legal Aspects, NACO & DGHS guidelines.
- Right to information, Donor Consent, reports, Leave letters, certificates
- Blood collection room equipment, their principles and use, emergency medicines.
- Pre donation counselling, Solutions & Method for preparing Phlebotomy Site, Test tube samples – Method of accurately relating product to donor bleeding of the donor, post donation care.
- Mandatory emergency medicines to be made available and their uses. Donor reactions and their management.
- Screening of blood units for mandatory tests, discarding infected units, post donation counselling.

Unit V:

- **Blood Donation drive:** Awareness programs prior to blood donation drive, Camp site, staff requirement, management of camp, transportation of blood units from camp site to blood bank.
- **Different types of Blood Collection** – Autologous blood donation, Therapeutic Phlebotomy Preservation of donated blood, blood preservation solutions, Additive solutions.

4. Blood Donation (Practical II)

- 1) Preparation of phlebotomy site.
- 2) Operation of blood collection monitor, tube sealer and needle burner.
- 3) Donor Room Protocol, Donor Screening Qualifying Test for Blood Donation-
Laboratory investigations.
- 4) Donor Suitability / Selection.
- 5) Selection of Bags for Collection of blood.
- 6) Blood Collection – Method of accurately relating product to donor.
- 7) Blood Collection Procedure.
- 8) Post Blood Donation Care.
- 9) Post donation instructions.
- 10) Management of adverse reaction.
- 11) Determination of ABO & Rh Blood Group (Reverse & Forward)- Tube method &
CAT method.
- 12) Preparation of 3-5% Red Cell Suspensions.

5. Basic Principles of Hospital Management

(Common to all specialties – Anaesthesia Technology, Cardiac Technology, Clinical Laboratory Technology, Renal Dialysis Technology, Radiology & Imaging Science Technology and Perfusion 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's and contracts (with special reference to major biomedical equipment's). 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 & Developments – 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. Hematology: Comprehensive Viva (IE)

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – IV

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Immuno hematology – General immunology Theory(UE)	60	-	20	-	60	-	80	4
2.	Practical I (UE)	-	120	-	20	-	60	80	4
3.	Microbiology & Biochemistry – Theory(UE)	60	-	20	-	60	-	80	4
4.	Practical II (UE)	-	120	-	20	-	60	80	4
5.	Health Care Management(IE)	60	-	20	-	60*	-	80	4
6.	General Immuno hematology & General immunology: comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

BLOOD BANK TECHNOLOGY

SYLLABUS

SEMESTER-IV

1. Immuno hematology- General immunology THEORY (UE)

Unit I:

- Introduction to Immunology, History, Immunity. Basic Principles of immunohematology,
- Application of Blood groups: Population Genetics, Forensic medicine, Transfusion medicine.
- Antigens: Immunogen, allo-antigen, soluble antigen, Red cell antigen, Epitopes
- Antibodies: Polyclonal antibodies, development of antibodies, structure of immunoglobulins, characteristics of immunoglobulins

Unit II:

- Monoclonal antibodies: Hybridoma technology, Human monoclonal antibodies, Applications of MAb.
- Antigen antibody reaction: Antigen concentration, antibody concentration, enhancing media, other factors influencing antigen antibody reaction, Immunoassays: ELISA, IRMA, RIA.
- Cells of immune system: Phagocytic cells, Antigen presenting cells, Tcells, R cell subsets, B cells, CD Markers, Flowcytometry for counting T & B cells.

Unit III:

- ABO Blood Group Systems: History, Genetics, ABH antigens, Biochemical Synthesis of blood group antigens, Antigen sites, weaker variants, Bombay Phenotype, ABO antibodies.
- RH Blood Group Systems: History, Genetic, Molecular Genetics, Nature of Rh Antigens, Partial D, Weak D, other variants of Rh, Rh Null, Rh antibodies, factors influencing Rh immunization, Functional role of Rh antigens.

Unit IV:

- Antenatal Serology, Hemolytic disease of the new born due to ABO Incompatibility, Rh Incompatibility and other allo-antibodies.

Unit V:

- Pre transfusion testing, Different methods of cross matching, cross matching in special circumstances, emergency cross matching, electronic cross matching.

2. Immuno Hematology (Practical I)

- 1) ELISA for HBsAg detection.
- 2) Rapid tests for HBsAg detection.
- 3) HCV antibody detection by ELISA.
- 4) HCV antibody detection by Rapid tests.
- 5) HIV (1+2) antibody detection by ELISA.
- 6) HIV (1+2) antibody detection by Rapid tests.
- 7) VDRL test for Syphilis.

3. Microbiology & Biochemistry – Theory(UE)

Unit 1:

- Introduction to Microbiology, Fundamentals of microscopy, sterilization and disinfection.
- Groups of Microorganisms, Microorganisms staining techniques.

Unit 2:

- Bacteriological media, Pure cultures and cultural characteristics, Bacteria of medical importance.

Unit 3:

- Transfusion transmitted infections, HIV (1+2), HCV, HBV, malaria, syphilis.
- ELISA, rapid and other tests for diagnosis of transfusion transmitted infections.

Unit 4:

- Introduction to Biochemistry, Acid and Base, Buffers and Buffer action, pH, The Beer Law & its application.
- Carbohydrates, Proteins, Lipids and Lipoproteins, Red cell membrane integral proteins and lipids, Biochemical estimation of Blood sugar, Proteins, Lipid profile and kidney function tests.

Unit 5:

- Instrumentation principles: pH meter, colorimeter, Spectrophotometer, Electrophoresis equipment.
- Biosafety, Management of Biomedical waste.

4. Microbiology & Biochemistry (Practical II)

- Malaria Parasite detection: Slide Method.
- Malaria Parasite detection: Rapid Method.
- Cleaning neutralization and preparation of glassware for sterilization.
- The Gram Stain.
- The Acid fast Stain.
- Staining for cell structure of organism.
- Preparation of culture media.
- Blood Glucose estimation.
- Blood urea estimation.
- Blood Cholesterol (Free and total) estimation.
- Bilirubin estimation.
- Serum Iron and TIBC estimation.
- Serum ferritin estimation.

5. HEALTH CARE MANAGEMENT[IE]

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.General Immuno hematology & General Immunology:

COMPREHENSIVE VIVA (IE)

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – V

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Organisation of Blood bank, Blood collection, Blood components - Theory(UE)	60	-	20	-	60	-	80	4
2.	Practical I(UE)	-	120	-	20	-	60	80	4
3.	Testing for Transfusion Transmitted diseases, Transfusion therapy - Theory(UE)	60	-	20	-	60	-	80	4
4.	Practical II(UE)	-	120	-	20	-	60	80	4
5.	Hospital Products, Promotion, Sales & Public relation (or) Physician's Office Management(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in General Bacteriology, Immunology, Virology and Mycology : comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

BLOOD BANK TECHNOLOGY

SYLLABUS

SEMESTER-V

1. Organisation of Blood bank, Blood collection, Blood components- THEORY[UE]

Unit 1:

- Introduction to blood bank equipments.
- Regional blood transfusion

Unit 2:

- Blood banks and blood storage centers, Blood bank premises and infrastructure.
- Mandatory Technical Staffing pattern of blood bank and role, functions and responsibility of each Technical staff.

Unit 3:

- Technical requirements: Accommodation and environmental conditions.
- Blood bank management system.

Unit 4:

- Terminologies used in blood banking including blood donation.
- Weight, Volume, Specific gravity, Conversion of weight to volume, Volume dilutions, Weight dilutions.

Unit 5:

- Regulations for blood bank operation, Drugs and Cosmetics Law.
- National blood policy, standards in blood bank, licensing procedures, ethical aspects of blood transfusion.

2.Organisation of Blood Bank (Practical I)

- Blood Collection using syringe.
- Bleeding of blood donor.
- Operation of blood collection monitor, tube sealer and needle burner.
- Platelet pheresis on cell separator (Baxter).
- Platelet pheresis on cell separator (Gambro or Hemonetics).
- Preparation of red cell concentrate and fresh frozen plasma.
- Preparation of washed red bold cells.

3. Testing for Transfusion Transmitted diseases, Transfusion therapy -

THEORY[UE]

Unit 1: Testing for Transfusion Transmitted diseases

- a) ELISA – HIV – HBs Ag, HCV
- b) VDRL Test
- c) Malaria.

Unit 2:

- Management of Blood Bank Counter, Criteria for acceptance of requisition form inspection of blood component prior to issue.
- Blood administration, transfusion filters, post transfusion care, Therapeutic plasma exchange.

Unit 3:

- Judicious use of blood; management of different types of anemia, management of bleeding patient, Neonatal transfusion, Transfusion practices in surgery, Transfusion therapy for oncology and transplantation patients.

Unit 4:

- Hemolytic transfusion reaction immediate and delayed; immune and non-immune reaction path physiology; Clinical signs and symptoms Laboratory invigilation for HTR Tests to detect bacterial Contamination in blood.

Unit 5:

- Non hemolytic transfusion reactions Immediate and delayed, febrile reaction, allergic reaction clinical signs and symptoms.
- Strategies to prevent transfusion reactions.

4. Transfusion therapy (Practical II)

- Preparation of washed red blood cells.
- Preparation of platelet concentrates by PRP method.
- Preparation of platelet concentrates by buffy coat method.
- Blood component preparation on component extractor.
- Preparation of leukoreduced platelets using leukocyte filter.
- Testing of haematological parameters of blood products.
- Measurement of factor VIII level in FFP.
- Measurement of fibrinogen level in FFP.
- Sterility test on platelet concentrates.
- Sterility test on Whole blood.
- Measurement of Ph and other platelet parameters.

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:

- **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.

- **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 & 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. CLINICALS IN GENERAL BACTERIOLOGY,
IMMUNOLOGY, VIROLOGY AND MYCOLOGY:
COMPREHENSIVE VIVA (IE)**

Exam pattern (IE) Total marks-100

1. VIVA-marks distribution (25 + 75 marks)

BLOOD BANK TECHNOLOGY
SCHEME OF EXAMINATION 2021
SEMESTER – VI

S.No	Paper	Hrs/Sem		Evaluation (Marks)					
		L	P	Internal Assessment		University Exams/Department* Exams		Total	Credits
				T	P	T	P		
1.	Transfusion Medicine – Bone marrow transplantation, Peripheral stem cells, Cord stem cells, Cord blood banking & Therapeutic transfusion – Theory(UE)	60	-	20	-	60	-	80	4
2.	Blood bank equipments & operation - Practical I (UE)	-	120	-	20	-	60	80	4
3.	Quality control (QC) management & Documentation – Theory(UE)	60	-	20	-	60	-	80	4
4.	Blood bank equipments & operation - Practical II (UE)	-	120	-	20	-	60	80	4
5.	Trauma & Cardiac Life Support(IE)	60	-	20	-	60*	-	80	4
6.	Clinicals in Clinical Chemistry: comprehensive viva(IE)	-	180	-	25	-	75*	100	5
TOTAL									25

Total No. of Hours – 600 Hours

U.E.-University Examination

I.E.-Internal Examination.

*These examinations shall be conducted by the respective department.

B.SC. ALLIED HEALTH SCIENCES

BLOOD BANK TECHNOLOGY

SYLLABUS

SEMESTER-VI

1. Therapeutic Transfusion Theory (UE)

Unit I:

- **Plasmapheresis:** Therapeutic plasma exchange is indicated in treating a number of diseases and conditions in areas such as Hematology/Oncology, Hepatic diseases, Neurology, Nephrology, Rheumatology, and Solid Organ transplant rejections.

Unit II:

- **Leukapheresis:** Therapeutic white cell depletion has been used to treat dramatically elevated white cell counts that can occur in acute Leukemia.
- **Erythrocytapheresis:** Therapeutic red cell exchange can be used to treat complications of Sickle Cell Disease, Severe babesiosis, and other conditions.

Unit III:

- **Plateletpheresis:** Therapeutic platelet depletion can be used for Thrombocytosis (such as Thrombocythemia) in symptomatic patients with platelet counts greater than 1,000,000/ML.
- **Photopheresis:** Photopheresis (white cells exposed to ultraviolet light) can be used to treat Cutaneous T-cell Lymphoma and Graft-Versus-Host Disease.

Unit IV

- **Peripheral Blood Stem Cell (PBSC) Collection:** PBSC collection is the extraction of stem cells from peripheral blood (as opposed to bone marrow) for potential use in Hematopoietic Stem Cell transplantation.

Unit V

- **Mononuclear Cell (MNC) Collection:** MNC collection is the extraction of mononuclear cells and lymphocytes from peripheral blood for potential manufacture and infusion in standard of care CAR-T therapy.

2. Blood bank equipments & operation (PRACTICAL I)

- Quality control of different blood bank components, sterility test on component.
- Quality control of blood bags
- Quality Assurance Hb & PCV
- Quality control of blood grouping reagents.
- QC of anti-human globulin reagent, bovine albumin, Normal saline, Antisera etc.
- QC of TTI test kits – ELISA, CLIA & Rapid.
- Quality control of all equipments, Calibration, Validation and maintenance of blood bank equipment.

3.Quality Control (QC) Management & Documentation THEORY (UE)

Unit I:

- Quality control of empty blood bags. Drugs and cosmetics law, National blood policy, licensing procedures and ethical aspects of blood transfusion.

Unit II:

- Blood Bank Accreditation – ISBT, NABL, NABH standards and accreditation.

Unit III:

- Legal and ethical aspects, Regulatory Acts, Bio hazard Waste Disposal Act, National blood policy.

Unit IV:

- Recent advances in Automation of Blood Banking.

Unit V: Quality Control:

Sensitivity – Specificity – Linearity – Accuracy & Precision, Primary Standard, Secondary standard, Calibration – Internal Quality control indicators, External Quality Control Program, test utilization and turnaround time, around time, Regulations for Lab (by Indian Govt Internatiour: Guideliness). Hospital management structure – organisation of clinical lab, Communication within the total hospital, communication within the lab, Personal Management, Work Scheduling, Continuous Quality improvement – Continuing education – resource management (Lab staff, reagents, supplies & capital equipment).

4. Blood bank equipments & operation (PRACTICAL II)

- **Quality Assurance** – Temperature Records, Sterility Testing.
- Internal QC and External QC.
- Quality Assurance blood components – red cells, FFP, Cryoprecipitate, platelet, red cell and WBC contamination.
- Calibration, validation, and maintenance of blood bank equipment.
- QC of blood bank technique.
- Documents, Registers, Records & Formats to be kept for licensing, Drug authorities inspection and compliance.

5. TRAUMA LIFE & CARDIAC LIFE SUPPORT [IE]

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.CLINICALS IN CLINICAL CHEMISTRY: **COMPREHENSIVE VIVA (IE)**

Text Book

1. Medical Lab Technology Methods & Interpretation – Ramnik Sood
2. Medical Lab Technology (3 Units) – Mukerjee

Reference Books

- 1) An introduction to practical Biochemistry 3rd ed. – David T. Plummer
- 2) Hand Book of Quality Assurance in Laboratory Medicine – Dr. Shubangi Tambwekar
- 3) Biochemical Calculation 2nd – Irwin H. Segel
- 4) Text book of Practical Biochemistry – Varley

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 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 interneers. No Marks are allotted. Satisfactory completion of Log Book is essential for completion of internship.

Day to day assessment of the interneers 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

INTERNSHIP

Skill Acquisition:

1. Blood Banking Organization - 3 month
2. Clinical Pathology Hematology - 2 month
3. Microbiology Lab - 3 month
4. Blood Bank Posting Blood Duration & Donor Management - 4 month

The intern is expected to demonstrate competence and independence in carrying out the following activities:

I. Blood Banking

- Have adequate skills to administer required protocols and develop good laboratory practice of standard operative procedures related to blood screening, blood collection and processing
- Have adequate training for donor education, motivation, recruitment and selection
- Have adequate basic knowledge relating to various machineries involved in executing blood bank procedures
- Be able to write reports as well as counsel the donors
- Be able to independently pain, execute and maintain records relating to all blood bank procedures
- Be capable of handling problems associated with various test reports as well as trouble shooting and maintenance of various machines involved in the execution of blood banking procedures
- Be capable of handling and rectifying errors occurring in day to day practice
- Have had adequate exposure to blood donation camps and be capable of organizing them individually as well as have interaction with the public

II. Clinical Pathology [Hematology]

- Have knowledge and be able to perform all the diagnostic tests done in the laboratory according to standard operative procedure
- Have basic knowledge about operation and maintenance of all equipment's used in the laboratory including troubleshooting
- Should know about quality control programmes implemented in the laboratory
- Be familiar with the normal reference ranges of all tests done in the laboratory and be able to interpret results which are out of range
- Should be able to handle administrative and supervisory responsibilities

III . Microbiology:

Duration of postings - 1 month

The student should:

- Have the basic knowledge of all laboratory diagnostic procedures for infectious diseases
- Have the skills to carry out all microbiological technical procedures
- Be able to supervise sterilization and disinfection procedures in the laboratory
- Have knowledge of handling instruments and maintenance of equipments related to microbiology
- Be able to follow procedures needed for maintain quality control in the laboratory
- Have the basic knowledge about molecular techniques and special microscopic procedures
