GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT (GITAM)

(Deemed to be University)

VISAKHAPATNAM |HYDERABAD | BENGALURU

Accredited by NAAC with A^{++} Grade

Regulations and Syllabus of

B.Sc. RENAL DIALYSIS TECHNOLOGY

(W.e.f. 2024-2025 admitted batch)

B.Sc RENAL DIALYSIS TECHNOLOGY

(with effect from 2024-25Admitted Batch)

ADMISSIONS

Admissions into Allied and Healthcare Professions (Specialization in RENAL DIALYSIS TECHNOLOGY) program of GITAM (Deemed to be University) are governed by GITAM (Deemed to be University) admission regulations.

ELIGIBILITY CRITERIA

Eligibility:

- He/She has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in Physics, Chemistry, Biology.
- He/She has attained the age of 17 years as on current year & maximum age limit is 30 years.
- For the candidates who have studied abroad, the rules of GITAM (deemed to be University) will be followed.

ABOUT THE COURSE:

B.Sc. Renal Dialysis Technology is a four years programme in the paramedical field. Students pursuing this programme will learn about the excess water, solutes, and toxins removal from the blood in patients whose kidneys can no longer work naturally. Students choose the B.Sc. Renal Dialysis Technology programme, the most among other paramedical programmes. The objective of this programme is to train students to provide hemodialysis treatments for renal failure patients under the guidance of a nurse or doctor. The use of equipment for dialysis is taught in this programme.

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Course Administration

The course is delivered in 8 semesters with each semester dealing with prescribed subjects.

- All subjects are mandatory for the student. The student will be trained in both theory and practical/clinical aspects of the course. Student is assessed by formative and summative assessment every semester.

- There will be one internal exam before the semester-end exam. Candidates should score a minimum of 35% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- A candidate shall be declared to have passed in the concerned subject, if he fulfills the following criteria
  - He / She secured 35% marks in the internal assessment and
  - (a) He / She secured 40% marks in theory and
    (b) 50% marks in practicals & viva and
    (c) 50% marks in theory, practical &viva put together in each subject

separately. Course objectives and learning outcomes are specified leading to clarity on what astudent would be able to do at the end of the program.

STRUCTURE OF THE PROGRAM

The program is a four-year program comprising of eight semesters that is credit and semester based. The courses are categorized into foundational courses and core courses.

- Foundation Course (FC)
- Core course (C)

Each academic year consists of two semesters. The curriculum structure of the B.Sc. Paramedical program and the contents for various courses offered are recommended by the Board of Studies concerned and approved by the Academic Council.

MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English. The method of instruction shall comprise classroom lectures, guest lectures, demonstrations, presentations, role-playgroup discussions, seminars, class tests, case analysis, situational analysis, practical training etc.

ATTENDANCE REQUIREMENTS

- A candidate must have not less than 75% attendance in theory and 80% in practicals separately.

ELIGIBILITY TO APPEAR FOR SEMESTER EXAMINATION

- Candidates should score a minimum of 40% marks theory and practical internal assessment examination separately to be eligible to appear in the University exam in that subject.
- There will be one internal exam before the semester- end exam.
- Internal marks will be considered for eligibility for the semester exam but will not be added for the semester exam.

EXAMINATION DURATION AND PATTERN

a. Pattern of question paper (60 Marks): 2 ½ hrs duration

Short notes	**6Marks each (5Q)**	**=**	**30Marks**
Very Short Notes	**2Marks each (10Q)**	**=**	**20Marks**
MCQs	**1Mark each (10Q)**	**=**	**10 Marks**

Subjects:

- Biochemistry
- Microbiology
- Pathology
- General Surgery

- Principles of Laboratory management (For B.Sc. MLT)
- Parent Depts.

b. <u>Pattern of question paper (40 Marks) : 2 hrs duration</u>

Short notes	**4Marks each (5Q)**	**=**	**20Marks**
Very Short Notes	**2Marks each (10Q)**	**=**	**20 Marks**

Subjects:

- Introduction to Healthcare Delivery System, Research Methodology & Biostatistics
- Introduction to Quality and patient safety
- Basic Computers and Information Science
- English, Communication and soft skills
- Professionalism & Values
- Principles of management (For B.Sc. Anesthesiology Technology, Optometry, Radiology and Imaging Technology, Renal Dialysis Technology, Emergency Medical Technology)
- Medical Law & Ethics
- Pharmacology
- General Medicine

c. Pattern of question paper (60 Marks [30 + 30]): 2 ½ hrs duration.

Short notes	**3Marks each (5Q)**	**= 15 Marks**
Very Short Notes	**2Marks each (5Q)**	**= 10 Marks**
MCQs	**1Mark each (5Q)**	**= 05 Marks**

Subjects:

Anatomy-I (Part-A) & Physiology-I (Part-B)

Anatomy-II (Part-A) & Physiology-II (Part-B)

<u>PAPER SETTING</u>

Paper setting, paper valuation and practical examination is done by internal examiners from the I to VI semesters.

<u>CRITERIA FOR EXAMINER</u>

Professor or Associate Professor or Assistant Professor are eligible to be as examiners.

<u>GRACE MARKS</u>

Maximum 5 marks can be awarded to one subject provided he/she passed all the other subjects or these 5 marks can be split for maximum 2 subjects.

<u>PASS CRITERIA</u>

A candidate shall be declared to have passed the examination if he/ she secured…

(a) 40% marks in theory.
(b) 50% marks in practical & viva
(c) 50% marks in theory, practical & viva put together in each subject separately.

EVALUATION:
Single valuation is done for the theory exams and for the practical exams.

REVALUATION:
Revaluation of the theory answer scripts of the end-semester examinations is also permitted on request, on payment of the prescribed fee within seven days from the date of announcement of the results.

REAPPEARANCE FOR BACKLOGS :
A student who has secured 'F' grade shall have to reappear for the examination as per the regulations to improve the grade.

A student who has secured 'F' grade in Project work / Industrial Training etc., has to re-appear for Viva – Voce to improve the grade.

ANSWER SCRIPT VERIFICATION & CHALLENGE VALUATION:

A provision for Answer Book Verification & Challenge Valuation was given on the following conditions.

- The verification is allowed only after announcement of revaluation results in case of UG programs.
- If the student is not satisfied with the marks awarded in revaluation, he/she can apply for Answer Book verification on payment of prescribed fee for each paper (Program) within one week after announcement of Revaluation results.
- If the student is not satisfied with the marks awarded after Answer Script Verification (i.e. Revaluation marks), he/she can apply for Challenge Valuation on payment of prescribed fee for each paper (Program) within two weeks from the date of Answer Book Verification.

ASSESSMENT GUIDELINES

RELATIVE GRADING

S.No.	Grade	Description	Grade Formula	Grades based on percentile for a normal distribution	Grade Point
1.	O	Outstanding	Total Marks≥(μ+ 1.5σ)	93.3	10
2.	A+	Excellent	(μ+ 1.0σ)≤Total Marks<(μ+1.5 σ)	84.1	9
3.	A	Very Good	(μ+0.5 σ)≤ Total Marks<(μ+ 1.0 σ)	69.1	8
4.	B+	Good	(μ-0.5σ) ≤Total Marks<(μ+0.5σ)	30.8	7
5.	B	Above Average	(μ- 1.0 σ) ≤Total Marks<(μ- 0.5σ)	15.8	6
6.	C	Average	(μ- 1.5σ)≤Total Marks<(μ-1.0σ)	6.6	5
7.	P	Pass	40≤Total Marks<(μ- 1.5 σ)	2.2	4
8.	F	Fail	Total Marks <40	0	0
9.	Ab	Absent			NA
10.	S	Satisfactory for Non-graded courses			NA
11.	U	Unsatisfactory for Non-graded courses			NA
12.	R	Insufficient attendance in the course			0
13.	W	Withdrawal from the course			0

In the relative grading system (RG), grades are given based on the other students' scores in the same class. It indicates the academic standing/merit of the student in that class. Here, class means a cohort of students who are taught by the same faculty member and have undergone the same assessment pattern. RG overcomes problems encountered with AG, including inconsistency in the level of the question paper and evaluation etc. This evaluation procedure is adopted for T (Theory), TP (Theory and practical) and certain chosen practical courses. The grades and grade points in the relative grading system are as given below. The class average mark (μ) is taken as the midpoint of 'B+ (Good)' grade, and relative to this and depending on the sigma (σ, standard deviation) value, the other grades are finalized. Grades are assigned based on the percentiles determined for a normal distribution given in the table below.

Computing Grade point averages (SGPA,CGPA)

The procedure adopted for computing the grade point average for the semester and cumulative is as follows:
Semester Grade point average(SGPA)for a semester is calculated as:

$$\text{SGPA} = \frac{\sum_{i=1}^{n} Ci * Gi}{\sum_{i=1}^{n} Ci}$$

where 'n' is the number of courses taken by the student in a semester. 'Ci' represents the number of credits allotted to the course 'i'.
'Gi' represents the grade points secured by the student in course 'i'.

Cumulative Grade Point Average (CGPA):It is calculated as:

$$\text{CGPA} = \frac{\sum_{i=1}^{m} Ci * Gi}{\sum_{i=1}^{m} Ci}$$

where 'm' is the number of courses graded to date.
'Ci' represents the number of credits allotted to the course 'i'.
'Gi' represents the grade points secured by the student in course 'i'.

The SGPA will be awarded to the students for all the registered courses in a semester. The credits of the failed courses shall also be considered while calculating SGPA/CGPA in a given semester. For cases where multiple attempts have been made to get a letter grade, the last successful attempt will be used for the CGPA calculation.

The additional credits earned by a student over and above the minimum required for a said category in a program will not be considered for the calculation of CGPA. However the courses which contribute towards higher CGPA will be considered for inclusion.

Calculation of CGPA

The CGPA shall be calculated taking into consideration the grades of courses obtained by the candidates in GITAM. In the case of Study Abroad, Twinning, Joint or Dual Degree Programs, the CGPA will be calculated according to the respective policy applicable and prevailing at the time of joining the program.

Incomplete (I) Grade

'I' grade is assigned if the student has any pending assessment components in Internship, Project and research. The student can initiate the request through the Mentor, and an 'I' grade will be posted after receiving the recommendation from the HoD.

Repeat (R) grade

'R' grade is assigned if the student has to repeat the course due to a shortage of attendance. The student has to re-register for the course in the subsequent semesters when the course is next offered by paying the prescribed fees.

Withdrawal (W) grade

'W' grade is assigned if the student has withdrawn from the course within twenty (20) working days of the semester.

Award of class

The cumulative grade point requirement for the award of the class is as follows:

Class	CGPA required
First-class with distinction	7.5 and above
First-class	6.00 - 7.49
Second class	≥ 5.5
Pass class	≥ 5.0

*In addition to the required CGPA of 8.0 or more, the student must have necessarily passed all the registered courses in the first attempt. Distinction will not be awarded if the student fails in ANY subject.

Transcript Format

Based on the above recommendation on letter grades, grade points, SPGA and CGPA, the transcript shall be issued for each semester with a consolidated transcript indicating the performance in all semesters.

VISION:

To become a leader of excellence in healthcare and health professions' education pioneering in experiential learning, redefining compassion, service and self-reliance to produce and nurture the next generation of visionary healthcare professionals

MISSION:

1. Develop a need-oriented learning ecosystem promoting critical thinking and holistic development
2. Offer evidence-based healthcare training at par with global standards
3. Encourage autonomy and innovation for healthcare delivery to achieve atma-nirbhar
4. Inculcate a philosophy of empathetic healthcare service within GITAM, fostering passionate health professionals

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To impart knowledge and skill in accordance with the requirement in basic medical sciences and paramedical specialty as relevant
PEO 2	To impart training required to carry out necessary investigative procedures accurately to facilitate proper diagnosis and prognosis of diseases
PEO 3	To train the student to perform routine as well as special investigative procedures in the concerned paramedical specialty
PEO 4	To impart knowledge and practical training required to operate and maintain all equipment used in the concerned specialization
PEO 5	To impart knowledge about communication skills, basic research skills, professionalism, and ethical aspects required in various health care settings for effective delivery of health care

PROGRAMME OUTCOMES (POs)

PO1	To prepare a cadre of healthcare technologists who can effectively assist senior health professionals in the delivery of quality healthservices.
PO2	To prepare skilled paramedical human resources for all levels of the healthcare delivery system from primary to tertiary care level.
PO3	To train the students to carry out necessary procedures accurately and to facilitate proper diagnosis and prognosis of diseases.
PO4	To enable to perform routine as well as special investigative procedures inthe concerned paramedical specialty.
PO5	To develop knowledge and skill in accordance with the demand in the field of paramedical specialty as applicable.
PO6	To enable to operate and maintain all types of equipment used in the concerned specialization.
PO7	To make capable to support advanced testing activities and Research.
PO8	To enable to work as Supervisor/Trainer/Teacher in the field of Paramedical sciences.

PO9	To enable to communicate and interact effectively with non-clinical and clinical persons in various healthcare environments
PO10	To be able to present oneself in an ethical and professional manner
PO11	To equip the paramedical staff with modern skills and knowledge to bring them at par with other national and international standards
PO12	Students who complete these programs will be able to work in both an individual and team environment

PROGRAM SPECIFIC OUTCOMES (PSOs)

At the end of course the student will be able to:

PSO1	Will be able to understand the basics of kidney function in health and disease.
PSO2	Bed side patient examination and analysis in the dialysis room.
PSO3	Will be able to understand the basics of dialysis procedure.
PSO4	Learn to use microbiological safety precautions in the dialysis room..
PSO5	Learn about dialysis procedure and water treatment.
PSO6	Will be learning about peritoneal dialysis, continuous renal replacement therapy.
PSO7	Understanding the practical applications of dialysis procedure at bedside And dealing with complications..
PSO8	Manage dialysis procedures–both Hemo and peritoneal and deal with Complications.

SUBJECTS FOR SEMESTER EXAMS WITH HOURS AND CREDITS

Semester - I									
S. No	**Subject Code**	**Subject**	**Hours**			**Credits**			**Course Type**
			Theory	**Practical**	**Total**	**Theory**	**Practical**	**Total**	
1	24CMED1001	Introduction to Healthcare Delivery System in India, Community orientation and clinical visit, Research Methodology & Biostatistics	15	0	15	1	0	1	FC
2	24PSGY1001	Anatomy - I (Part-A)	30	15	45	2	0.5	2.5	C
		Physiology - I (Part-B)	45	15	60	3	0.5	3.5	C
3	24MIBG1001	Introduction to Quality and patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	60	60	120	4	-	4	FC
4	24CSEN1071	Basic Computers and Information Science	15	30	45	1	-	1	FC
5	LANG1281	English, Communication and soft skills	30	-	30	2	-	2	FC
6	24CMED1011	Professionalism and values	15		15	1	-	1	FC
7	ODHR1001	Principles of Management	15	-	15	1	-	1	FC
		Total	**225**	**120**	**345**	**15**	**1**	**16**	
Semester - II									
1	24PSGY2001	Anatomy – II (Part-A)	30	15	45	2	0.5	2.5	C
		Physiology – II (Part-B)	45	15	60	3	0.5	3.5	C
2	24BCHE1021	Biochemistry	30	15	45	2	0.5	2.5	C
3	24FMED1001	Medical Law and Ethics	15		15	1		1	FC
4	24GMED1011	Clinical Education - I		375	375		12.5	12.5	C

		Total	**120**	**420**	**540**	**8**	**14**	**22**	
Semester - III									
1	24NURS1001	Basics of Patient Care	30	-	30	2	-	2	FC
2	24MIBG1031	Microbiology	60	15	75	4	0.5	4.5	C
3	24PATH1031	Pathology	60	15	75	4	0.5	4.5	C
4	24GMED2001	Clinical Education - II		360	360	-	12	12	C
		Total	**150**	**390**	**540**	**10**	**13**	**23**	
Semester-IV									
1	24PHCG1001	Pharmacology	30		30	2		2	C
2	24GMED3001	Concepts of renal disease, dialysis & nutrition	30		30	2		2	C
3	24GMED3011	Applied Dialysis Therapy Technology – Part I Pharmacology related to dialysis technology	60	120	180	4	4	8	C
4	24GMED1021	Clinical Education - III		300	300		10	10	FC
		Total	**120**	**420**	**540**	**8**	**14**	**22**	
Semester-V									
1	24GMED3021	Applied Dialysis Therapy Technology – Part II	60	120	180	4	4	8	C
2	24GMED3031	Clinical Education - IV		360	360			12	C
		Total	**60**	**480**	**540**	**4**	**16**	**20**	
Semester-VI									
1	24GMED3041	Applied Dialysis Therapy Technology – Part III	60	120	180	4	4	8	C
2	24GMED3051	Clinical Education- V		360	360			12	C
		Total	**60**	**480**	**540**	**4**	**16**	**20**	
Semester-VII & VIII									
		BSc.DTT Internship		1440	1440				

SEMESTER - I

INTRODUCTION TO HEALTHCARE DELIVERY SYSTEM, RESEARCH METHODOLOGY & BIOSTATISTICS

INTRODUCTION:

The art and science of application of technical knowledge and skills to the delivery of health care to given community, designed in collaboration with related professionals as well as human and social science on one hand and the community on the other hand. Preventive medicine is science and art of preventing disease, prolonging life and promoting physical and mental health and efficacy.

COURSE OBJECTIVES:

- To orient the students with national health programs
- To learn categories and coding of hospital waste and their disposal methods.
- To know various occupational health hazards and prevention and control of them.
- To make the students aware of tabulation of data, measuring mean and SD

SYLLABUS

Hours: Theory 15

Credits: Theory 01

NO. OF UNITS	CONTENT	NO. OF HOURS
I	**Introduction to healthcare delivery system** a) Healthcare delivery system in India at primary, secondary and tertiary care, Principles and Elements of Primary Health Care b) National Health Mission c) National Health Policy 2017	3
II	**National Health Program:** Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programs. **Introduction to AYUSH system of medicine and Need for integration of various systems of medicine**	3
III	**Demography & Vital Statistics:** a) Demography – its concept b) Vital events of life & its impact on demography c) Significance and recording of vital statistics d) Census & its impact on health policy **Epidemiology:** a. Principles of Epidemiology b. Natural History of disease c. Methods of Epidemiological Studies **d.** Infectious disease epidemiology - dynamics of disease transmission, host defence immunizing agents, cold chain, immunization, disease monitoring and surveillance.	5
VI	**Research Methodology:** 1. Introduction to research methods 2. Identifying research problem 3. Ethical issues in research	3

	4. Research design 5. Basic Concepts of Biostatistics 6. Types of Data 7. Research tools and Data collection methods 8. Sampling methods 9. Developing a research proposal	
V	**Biostatistics** The objective of this is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.	1

COURSE OUTCOMES:

This course is aimed to make the student to understand national health programs, hospital waste management, occupational health hazards prevention and control of occupational diseases and calculation of measures of central tendency and diagrammatic representation of data.

REFERENCES:

- Park's Textbook of Preventive and Social Medicine – 26th edition
- Statistics and Research: Mahajan

ANATOMY - I

INTRODUCTION:

Anatomy deals with the structural organization of the human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture in to the clinical domain. The department of anatomy is committed to providing quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides, and various models provide the ideal environment to learn anatomy during the 1st year of their course.

COURSE OBJECTIVES:

- The objective of this subject is to provide an outline of anatomy to improve the students understanding of the technical and diagnostic procedures used, with special emphasis on applied aspects.

SYLLABUS

Credits: Theory 2 & Practical 0.5

Hours: Theory 30 & Practical 15

Theory:

UNIT	CONTENT	No. OF HOURS
I	**Introduction to anatomical terms and organization of the human body** 1.Undertanding the anatomical terms relative to position–anterior, ventral, posterior dorsal, superior, inferior, median, lateral, proximal, distal, superficial, deep, prone, supine, palmar and plantar Anatomical planes (axial/ transverse/horizontal, sagittal/vertical plane and coronal/frontal/oblique plane) 2.Describe the Movements (flexion, extension, abduction, adduction, medial rotation, lateral rotation, inversion, eversion, supination, pronation, plantar flexion, dorsal flexion and circumduction 3. Describe the Cell structure, Cell division, 4.Define the Tissue and classify various types, characteristics, classification, location 5. Describe the location of Hyaline cartilage ,fibrocartilage, elastic cartilage, 6.Describe the Histology of Bone, 7. Describe the Features of skeletal, smooth and cardiac muscle.	5
II	The Respiratory system 1. Describe the Structure of the organs of respiration.	5

	2. Describe the morphology of Pleura, 3. Describe the Morphology of Lungs, Bronchopulmonary Segments. 4. Histology of Lungs	
III	Cardiovascular system 1. Describe the Morphology of Heart, Internal features of Heart – right atrium and right ventricle Chambers & Openings of the heart, 2. 2.Classify Types of Circulation and understand Coronary Circulation in detail 3. Describe Aorta its parts and its branches.	8
IV	Muscular system types of muscles 1. Describe Muscles of Upper Limb including Arm and Fore Arm, 2. Describe Muscles of back, diaphragm, Muscles of arm, Muscles of Forearm 3. Understand the Significance of Deltoid Muscle, 4. Describe the Muscles of Lower Limb, Muscles of thigh, Muscles of Leg 5. Understand the significance of Gluteus Maximus Muscle.	5
V	1. Describe the Blood vessels of Upper Limb : Arm- Axillary artery, brachialartery 2. Describe arteries of fore Arm - Radial artery, ulnar Artery, medial cubital vein, 3. Describe the Blood vessels of Lower Limb : Thigh femoral artery, popliteal artery	7

Practical:

NO. OF UNITS	CONTENT	NO. OF HOURS
I	Microscopy, Histology of tissues – cartilage, Bone and Lung	2
II	Intercostal space, Heart, Lungs	3
III	Upper Limb – Bones, Muscles, Axillary artery, brachial artery, fore Arm - Radial artery, ulnar Artery, medial cubital vein, Nerves : Axillaries Nerve , Median Nerve, Ulnar Nerve, radial Nerve	4
IV	Lower Limb – Bones, Muscles, Thigh femoral artery, popliteal artery Nerves of Lower Limb: Femoral Nerve, Sciatic Nerve, Obturator Nerve	4
V	Normal X- Rays, Surface markings	2

COURSE OUTCOMES:

- Explains knowledge on the basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuroanatomy, endocrine system, basic radiology which provides a foundation

in completion of the course.

- Explain the anatomy and functions of various Tissues and cells, an organization of a cellular system.
- Understand the functioning of lungs, heart, and blood vessels.

REFERENCES:

1. BD Chaurasia : Handbook of general anatomy
2. Textbook of Anatomy & Physiology by Indu Khurana&Arushi
3. Textbook of Anatomy & Physiology by PR Ashalatha& G Deepa
4. Textbook of Anatomy & Physiology by Ashalatha N Nandedkar, Vijay D Joshi & Sadhana – 3rd edition

PHYSIOLOGY - I

INTRODUCTION

Physiology is the study of functions and mechanisms in a living system. Physiology focuses on individual organs, cells, and bio molecules carrying out the chemical and physical functions in a living system. The physiological state is the condition of normal function, while the pathological state refers to abnormal conditions, including human diseases.

Course Objective

- Understand the basic physiological functions of different organs and parts of the human body and important applied aspects.

SYLLABUS

Credits: Theory 3 & Practical 0.5

Hours: Theory 45 & Practical 15

NO. OF UNITS	CONTENT	NO. OF HOURS
I	Cell Physiology Immunity 1. Describe the structure and functions of cell 2. Describe the functions of the cell organelles 3. Describe briefly the types of transport across cell membrane and carrier systems	3 2
II	Blood Physiology 1. Describe the normal composition of human blood and its functions 2. Describe the normal plasma proteins & their functions 3. Describe the structure and functions of RBC and hemoglobin 4. Describe the process of Erythropoiesis 5. Describe the Structure, production, & functions of WBCs 6. Describe the structure, production & functions of Platelets 7. Describe the Types of blood groups and their importance, 8. Describe the Mechanism of coagulation 9. Define immunity and describe the types of immunity 10. Classify antigen & antibodies 11. Describe T cell immunity & B cell immunity	8
III	**Muscle & Nerve Physiology; ANS** 1. Describe the physiological structure of muscle tissue and its types 2. Describe the parts of neuron and their functions, and the synapse and its function 3. Describe the action potential, its basis, refractory period, latent period, etc. and neuromuscular transmission Describe briefly the autonomic nervous system and the functions and effects of the sympathetic and parasympathetic nervous systems	7
IV	**Digestive System** 1. Describe briefly the Physiological anatomy of G.I.T and its functions. 2. Describe briefly the composition and functions of Saliva 3. Describe briefly the physiological anatomy of the stomach and the composition, functions of gastric juice. 4. Describe briefly the functions of pancreas , and the composition & functions of pancreatic juice.	5
V	**Respiratory System** 1. Describe the physiological structure and functions of Respiratory tract.	5

	2. Describe the Mechanics of respiration and its regulation 3. Describe the Fundamentals of oxygen and CO2 transport in blood 4. Describe the lung volumes, spirometry & their importance	
NO. OF UNITS	**CONTENT - PRACTICALS**	**NO. OF HOURS**
I	Estimate Hemoglobin in given blood sample, Estimate bleeding time & clotting time	8
II	Measure ESR of given blood sample, Perform RBC count of given blood sample	8
III	Perform WBC count of given blood sample Perform a differential WBC count of the given sample	4
IV	Calculation of blood indices, Determination of Blood Groups	4
V	Measure pulse rate, heart rate, Measure BP, respiratory rate & temperature	6

COURSE OUTCOMES:

- Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system.
- Explain Hematopoietic and lymphatic system homeostatic and its altered physiology.
- Explain the anatomy and Physiology of the cardiovascular and respiratory system and its disorders.
- Explain the anatomy and Physiology of digestive, urinary, and reproductive systems and their disorders.
- Describe the Physiology of muscle contraction and its disorders.

REFERENCES:

- Textbook of physiology for BDS AK Jain 6th edition
- Textbook of physiology for BDS Sembulingam 3rd edition

  Physiology in nutshell by AK Jain 5th edition

INTRODUCTION TO QUALITY AND PATIENT SAFETY

Rationale: The subject will introduce the students to the basic concepts of quality in health care and develop skills to implement sustainable quality assurance program in the health system. It will sensitize them in basic emergency care, infection prevention & control with knowledge of bio medical waste management and antibiotic resistance.

Syllabus
Theory: 60 hrs Credits 4
Practical: 60hrs

NO OF UNITS	(THEORY) CONTENT	No. OF HOURS
I	Quality assurance and management 1. Concepts of Quality of Care 2. Quality Improvement Approaches 3. Standards and Norms 4. Quality Improvement Tools 5. Introduction to NABH guidelines	10
II	Basics of emergency care and life support skills 1. Vital signs and primary assessment 2. Basic emergency care – first aid and triage 3. Ventilations including use of bag-valve-masks (BVMs) 4. Choking, rescue breathing methods 5. One- and Two-rescuer CPR 6. Using an AED (Automated external defibrillator). 7. Managing an emergency including moving a patient	10
III	Bio medical waste management and environment safety 1. Definition of Biomedical Waste 2. Waste minimization 3. BMW – Segregation, collection, transportation, treatment and disposal (including color coding) 4. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste 5. BMW Management & methods of disinfection 6. Modern Technology for handling BMW 7. Use of Personal protective equipment (PPE) 8. Monitoring & controlling of cross infection (Protective devices	10
IV	Infection prevention and control 1. Evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective Equipment (PPE)]. 2. Prevention & control of common healthcare associated infections 3. Components of an effective infection control program, and 4. Guidelines (NABH and JCI) for Hospital Infection Control	10
V	Antibiotic Resistance 1. History of antibiotics 2. How resistance happens and spreads 3. Types of resistance- intrinsic, acquired, passive 4. Trends in drug resistance 5. Actions to fight resistance 6. Bacterial persistence 7. Antibiotic sensitivity 8. Consequences of antibiotic resistance 9. Antimicrobial Stewardship – Barriers and opportunities, tools and	10

	models in hospitals	
VI	Disaster preparedness and management 1. Fundamentals of emergency management 2. Psychological impact management 3. Resource management 4. Preparedness and risk reduction 5. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.	10

SUGGESTED READINGS :

1. The Essentials of Patient Safety by Charles Vincent
2. Laboratory quality control and patient safety by De Gruyter

PRACTICALS	**No. OF HOURS**
QUALITY AND PATIENT SAFETY a) Discussion on Concepts of Quality of Care b) Approaches to Quality Improvement c) Quality Improvement Tools **d)** Discussion on NABH guidelines and its exercises	60
BASICS OF EMERGENCY CARE AND LIFE SUPPORT SKILLS 1. Vital signs and primary assessment 2. Basic emergency care – first aid and triage 3. Ventilations including use of bag-valve-masks (BVMs) 4. Choking, rescue breathing methods 5. One- and Two-rescuer CPR 6. Using an AED (Automated external defibrillator). **7.** Managing an emergency including moving a patient Students should perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions.	
BIO MEDICAL WASTE MANAGEMENT AND ENVIRONMENT SAFETY 1. Visit to Central Sterile Supply Department (CSSD) 2. Visit to incinerator complex 3. Visit to Immunization section 4. Discussion on Biomedical Waste, 5. Demonstration of Types of waste generated from Health Care Facility 6. Discussion on waste minimization 7. Poster presentation of BMW – Segregation, collection, transportation, treatment and disposal (including color coding) 8. Discussion on Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste 9. Visit to Central Sterile Supply Department for demonstration of BMW Management & methods of disinfection 10. Modern Technology for handling BMW e.g. Incenerator, Shredder etc. 11. Demonstration of proper use of Personal protective equipment (PPE) 12. Demonstration of monitoring & controlling of cross infection (Protective devices)	
INFECTION PREVENTION AND CONTROL	

1. Demonstration of evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective Equipment (PPE)], 2. Discussion on prevention & control of common healthcare associated infections, 3. Preparing Charts & Posters of Components of an effective infection control program, and 4. Guidelines (NABH and JCI) for Hospital Infection Control	
ANTIBIOTIC RESISTANCE 1. Discussion on various types of Antibiotics 2. Demonstration of how Resistance Happens and Spreads 3. Discussion on types of resistance- Intrinsic, Acquired, Passive 4. Antibiotic sensitivity testing 5. Display of Consequences of antibiotic resistance 6. Demonstration of Antimicrobial Barriers and opportunities, Tools and models in hospitals	
DISASTER PREPAREDNESS AND MANAGEMENT 1. Discussion on fundamentals of emergency management, 2. Management psychological impact 3. Discussion on; 3.1 Resource management, 3.2 Preparedness and risk reduction	

BASIC COMPUTERS AND INFORMATION SCIENCE

INTRODUCTION:

Computer science spans theoretical disciplines (such as algorithms, theory of computation, and information theory) to practical disciplines (including the design and implementation of hardware and software). It deals with concepts regarding the architecture of a computer, common application software and uses of computers in everyday life.

COURSE OBJECTIVES:

To build necessary concepts regarding the architecture of a computer

To develop an understanding of the common application software.

To understand the uses of computers in everyday life.

SYLLABUS

Theory 15 hrs. & Credit 1
Practical 30hrs.

NO OF UNITS	CONTENT	NO. OF HOURS	NO. OF PRACTICAL
I	1. Describe and identify the principal components of a computer 2. Define the various terms used in computer – hardware/software / operating system 3. Describe the functions and uses of computers including in health care	2	4
II	1. Mention the common types of files including Word documents, Spreadsheets (Excel) and Presentations (PowerPoint) and their uses 2. Basic Network connecting 3. Explain the uses of the internet and email 4. Collaborative work using Google suite of applications / Microsoft Office 365	2	6
III	1. Demonstrate use of a computer for common purposes 2. Demonstrate methods for Data storage & retrieval and making folders; 3. Perform functions like date/time setting or changing, change display settings, Installing /removing programs etc. 4. Understand and Use MS Word / Word Document program 5. Prepare a properly formatted, spell-checked document in Word Document including insertion of images and tables and take a print-out/mail as an attachment, and convert to pdf (portable document format) 6. Understand and Use MS Excel / Data spreadsheet 7. Prepare a proper Excel document (spreadsheet) with given data and sort out data, insert / delete cells, etc., use formula bar for common functions like calculate mean etc, convert to pictorial format like bar / pie diagram, etc. 8. Prepare and use computer-based presentations like PowerPoint with appropriate fonts and colors including insertion of images, videos etc.	5	10
IV	1. Prepare an appropriate file like excel to enter patient data and retrieve it	3	6

	2. Use the facility of Mail Merge between Excel to a Word document 3. Sending customized email to selected members. 4. Prepare a patient report and take a print out		
V	1. Prepare a database of patient info and lab results for storage and later retrieval 2. Communicate by e-mail including opening email account 3. Demonstrate use of search engines / Google search etc. for academic information 4. Elements of Health Information - Definition, Key Features, Comparison with traditional methods, Benefits, Emerging Trends, and Challenges	3	4

LEARNING OUTCOMES:

At the end of the training program, the student would be able to

Classify various components of the computer.

Experiment with the various application software of Microsoft Office suite.

Make use of collaborative applications over the internet

COURSE OUTCOMES:

At the end of the course student is expected to

1. Know about the concept and architecture of a computer.
2. To understand the common application software.
3. To understand and apply the uses of computers in everyday life.

REFERENCES :

1. Introduction to Computers by Peter Norton (McGraw Hill Education)
2. Mastering Excel: A Problem-Solving Approach by James Gips (John Wiley and Sons)
3. SAMs Teach Yourself Computer Basics in 24 hours

ENGLISH, COMMUNICATION & SOFT SKILLS

INTRODUCTION:

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ Speaking / Reading/ Writing) skills It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives.

COURSE OBJECTIVES

- This course trains the students in oral presentations, expository writing, logical organization and structural support.
- By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

SYLLABUS
Hours:30 Credits: 02

NO. OF UNITS	CONTENT	NO. OF HOURS
I	**BASICS OF ENGLISH GRAMMAR** Vocabulary:- Synonyms , Antonyms, Prefix and suffix , Homonyms , Tenses , subject verb agreement , common errors in English.	8
II	**LISTENING AND SPEAKING SKILLS** Importance of listening and speaking. Barriers in listening and speaking. Good and persuasive listening and speaking Note Taking, Watching Video Clips and Listening to Audio Clips, Listening to and Watching News and Panel Discussions JAM (Just-A-Minute),Oral Presentation , Group Discussion	8
III	**READING AND WRITING SKILLS** Efficient and fast reading, Importance of Skimming and Scanning	4
IV	Letter Writing, Email, Essay, Paragraph writing, Articles, Memos, note making and Comprehension.	4
V	Common Medical Terminology and writing a medical report	6

COURSE OUTCOMES

- By the end of the course, the learners will be able to:
- Think critically, analytically, creatively and communicate confidently in English insocial and professional contexts with improved skills of fluency and accuracy.

- Write grammatically correct sentences employing appropriate vocabulary suitableto different contexts
- Comprehend and analyze different academic texts.
- Make notes effectively and handle academic writing tasks such as Paragraph writing and Essay writing.
- Effectively handle formal correspondence like e-mail drafting and letter writing.

REFERENCE BOOKS:

- Arosteguy, K.O. and Bright, A. and Rinard, B.J. and Poe, M. A Student's Guide toAcademic and Professional Writing in Education, UK, Teachers College Press, 2019
- Raymond Murphy, English Grammar in Use A Self-Study Reference and Practice Book for Intermediate Learners of English: Cambridge University Press;2019
- Peter Watkins, Teaching and Developing Reading Skills: UK, CUP, 2018
- Deeptha Achar et al. Basic of Academic Writing. (1and 2) parts New Delhi: OrientBlack Swan. (2012& 2013).
- Kumar S and Lata P, Communication Skills: New Delhi Oxford University Press, 2015

PROFESSIONALISM & VALUES
SYLLABUS
Hours : 15 Credits: 01

NO. OF UNITS	CONTENT	NO. OF HOURS
I	**Professional values** Integrity, Objectivity, Professional competence and due care, Confidentiality	3
II	**Personal values** E ethical or moral values	3
III	**Attitude and behavior** Professional behavior, treating people equally	2
IV	**Code of conduct** Professional accountability and responsibility, misconduct	2
V	Differences between professions and importance of team efforts	2
	Cultural issues in the healthcare environment	3

PRINCIPLES OF MANAGEMENT
SYLLABUS
Hours : 15 & Credits: 01

The course is intended to provide a knowledge about the basic principles of Management.

NO. OF UNITS	Content	No. of Hours
I	Introduction to management Strategic Management	3
II	Foundations of Planning Planning Tools and Techniques	3
III	Decision Making, conflict and stress management Managing Change and Innovation	3
IV	Understanding Groups and Teams Leadership	3
V	Time Management Cost and efficiency	3

SEMESTER – II

ANATOMY – II

INTRODUCTION:

Anatomy deals with the structural organization of human body. Anatomy forms the basis for the practice of medicine. Students need core knowledge of human anatomy as they venture into the clinical domain. The department of anatomy is committed to provide quality education for students by its fully-equipped facilities. Cadaveric dissections & specimens, histology slides and VARIOUS models provide the ideal environment to learnanatomyduringthe1st year of their course.

COURSE OBJECTIVES:

The objective of this subject is to provide an outline of anatomy to improve the students understanding the technical and diagnostic procedures used, with special emphasis on limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology.

SYLLABUS

Credits: Theory 2 & Practical 0.5

Hours: Theory 30 & Practical 15

Theory:

NO. OF UNITS	CONTENT	NO. OF HOURS
I	The Nervous system Review Structure of neurons; CNS, ANS and PNS (Central, autonomic and peripheral) – Peripheral nerves , Brachial, Lumbar, Sacral plexus, Covering of brain, Surfaces and lobes of cerebrum white fibers of cerebrum, cranial nerves, brain stem, spinal cord - spinal nerves, functional areas of cerebral cortex, Ventricular system – formation, circulation, and drainage	9
II	Gastro Intestinal Tract Stomach morphology, blood supply, applied aspects Liver morphology, ligaments blood supply applied aspects, porta hepatitis Small and large intestine, appendix and appendicitis	5
III	The Excretory system & Reproductive system Morphology , relations and internal Structure of kidney, urethra Components of female reproductive system, Morphology of uterus and its supports Parts of Fallopian Tube, Layers of scrotum, Anatomy of Testis and its coverings Spermatic cord, Male urethra & its parts	7
IV	The Endocrine system Endocrine glands, Structure of Hypothalamus, Pineal Gland, Pituitary gland- Dwarfism Thyroid- Goiter, Parathyroid, Pancreas – Diabetes Mellitus, Adrenal glands, Gonads	5
V	The Sensory organs Receptors, Structure of skin, Eye - Anatomy of orbit and eyeball, Anatomy of Nose, Anatomy of ear, Anatomy of tongue	4
Practical:		
NO.	**CONTENT**	**NO. OF**

OF UNITS		HOURS
I	Histology of Liver, Thyroid, Kidney	3
II	Liver, Stomach, Intestines	3
III	Spleen, Kidney	3
IV	Brain, Spinal card	3
V	Bony Pelvis, Skull, Normal X- Rays, Surface markings	3

COURSE OUTCOMES:

- This course is aimed to make the student to gain knowledge in basic anatomy of various regions like limbs, thoracic and abdominal viscera, osteology, neuro anatomy, endocrine system, basic radiology which provides foundation in completion of the course.
- Enable to understand about the Gastro Intestinal Tract, location, surfaces, lobes, relations, and blood supply of Liver.
- Enables to understand about the Endocrine glands and explain the morphology and blood supply of Thyroid gland.

REFERENCES:

1. Anatomy and physiology –Vijaya D Joshi, Ashalatha N Nandedkar, Sadhana SMendhurwar
2. Anatomy and physiology- Indu Khurana and Arushi Khurana
3. Human anatomy &physiology for nursing -Mahindra KumarAnand & Meena Verma
4. Understanding human anatomy & physiology- William Davis(McGraw-Hill)

PHYSIOLOGY – II

INTRODUCTION

Physiology is the study of functions and mechanisms in a living system. Physiology focuses on individual organs, cells, and biomolecules carry out the chemical and physical functions in a living system. Physiological state is the condition of normal function and this course helps in understanding the functions of endocrine system, renal physiology and reproductive physiology.

COURSE OBJECTIVES:

- To know about functions and physiological anatomy of endocrine system – Thyroid, Adrenal, Parathyroid, Pituitary glands and Pancreas.
- To impart knowledge related to physiological structure of kidney and the nephron and its functions.
- To understand about reproductive system, process and methods of determination of ovulation.
- To know about types of joints, the structure and formation of cartilage and the structure and formation of bone.

SYLLABUS

Credits: Theory 03 & Practical 0.5

Hours: Theory 45 & Practical 15

NO. OF UNITS	CONTENT	NO. OF HOURS
I	**Cardiovascular System** 1. Describe the gross structure of heart and the normal circulation of blood 2. Describe the cardiac cycle 3. Describe the normal arterial pulse wave and the normal heart rate, and factors increasing and decreasing it. 4. Describe normal Blood pressure and its regulation, 5. Describe the normal Heart sounds 6. Describe the normal ECG and its importance	12
II	**Endocrine Physiology** 1. Describe the physiological anatomy of Thyroid gland, functions and its applied physiology 2. Describe the physiological anatomy of Adrenal gland, functions and its appliedphysiology 3. Describe the physiological anatomy of Parathyroid gland, functions and its applied physiology 4. Describe the physiological anatomy of Pancreas, its functions and its applied physiology 5. Describe the physiological anatomy of hypothalamus and the Pituitary gland, their functions and its applied physiology	10
III	**Excretory Physiology** 1. Describe the physiological structure of kidney and the nephron and its functions 2. Describe the GFR and factors affecting GFR 3. Describe the Substances absorbed and secreted from renal tubules 4. Describe the various Renal function tests **5.** Describe briefly the Urinary bladder and its functions and the physiology of micturition **6.** Functions of skin	10

	7. Acid base balance	
IV	**Reproductive Physiology** 1. Describe the physiology of puberty 2. Describe the process of menstruation, normal menstrual cycle, menarche and menopause. 3. Describe briefly the process of ovulation and methods of determination of ovulation 4. Describe briefly the normal physiology of pregnancy and mention the diagnostic tests for pregnancy and their physiological basis 5. Describe briefly the functions of placenta and pregnancy diagnostic tests 6. List out the Contraceptive methods in male and female 7. Describe the Spermatogenesis	06
V	**Central Nervous System** 1. Describe the physiological anatomy of the brain and functions of different lobes 2. Describe briefly the structure and functions of spinal cord 3. Describe briefly the subdivisions of brain stem and their functions 4. Describe briefly the special senses and their pathways – vision, audition (& olfaction& taste) 5. Describe the normal EEG 6. Describe briefly the CSF formation, circulation, properties, composition and functions	07

PRACTICAL TOPICS	**NO. OF HOURS**
General examination –Brief history, General appearance, Vital data	02
Pulse and BP	03
Demonstrate examination of heart – inspect JVP, localize apex beat, look for any abnormal pulsations, percuss cardiac dullness, auscultate heart for normal sounds	02
Demonstrate examination of respiratory system – inspect the chest for symmetry, movements, localize apical impulse and trachea, measure chest expansion, percuss the chest for lung resonance, liver dullness, auscultate lungs for breath sounds	02
Demonstrate examination of the cranial nerves	02
Demonstrate the various sensory and motor reflexes - abdominal, plantar, biceps, triceps, supinator, knee, and ankle	02
Clinical charts	02

REFERENCE BOOKS

- Human Anatomy & Physiology for Nursing – Mahindra Kumar Anand & Meena Verma Understanding Human Anatomy & Physiology – William Davis (McGraw Hill) Anatomy & Physiology – Kaarna Muni Shekhar
- Textbook of Physiology for BDS students - Dr Jain
- Textbook of Physiology for BDS students – Dr Sambulingam
- Handbook of Human Physiology – Vidya Ratan
- Concise Medical Physiology – Sujith K Choudhari

BIOCHEMISTRY

INTRODUCTION:

Biochemistry deals with the structures, bonding, functions, and interactions of biological macromolecules, such as proteins, nucleic acids, carbohydrates, and lipids. They provide the structure of cells and perform many of the functions associated with life. Biochemistry focuses on understanding the chemical basis which allows biological molecules to give rise to the processes that occur within living cells and between cells, in turn relating greatly to the understanding of tissues and organs, as well as organism structure and function.

COURSE OBJECTIVES:

Students must understand the basic principles of Biochemistry and the biochemical processes that take place in the human body and their applied aspects.

SYLLABUS

Credits: Theory 02 & Practical 0.5

Hours: Theory 30 & Practical 15

No of Units	(THEORY) CONTENT	No. OF HOURS
I	**Enzymes** i. Define and classify with examples, active site, cofactor, proenzyme ii. List the factors affecting enzyme activity Define isoenzymes, enzymology (clinical significance of enzymes)	3
II	**Carbohydrate Chemistry & Metabolism** i. Define carbohydrates, classify carbohydrates with examples, explain glycosidic bond ii. Illustrate composition, sources, and functions of monosaccharides, disaccharides, oligosaccharides, and polysaccharides. iii. Illustrate glycolysis-aerobic, anaerobic, citric acid cycle, substrate phosphorylation iv. Elaborate glycogen metabolism -glycogenesis, glycogenolysis, metabolic disorders of glycogen, gluconeogenesis, Cori cycle v. Summarize hormonal regulation of glucose, glycosuria, diabetes mellitus	**4**
III	**Lipid Chemistry & Metabolism** i. Define and classify lipids ii. Functions of Fatty acids, Triacylglycerol, Phospholipids, cholesterol iii. Essential fatty acids and their importance iv. Explain Lipoproteins: definition, classification, function, ketone bodies v. Fat metabolism in adipose tissues vi. Elaborate ketone body metabolism: formation(ketogenesis), utilization(ketolysis), ketosis, Rothera's test vii. Summarize cholesterol metabolism: synthesis, degradation, cholesterol transport viii. viii.Define Hypercholesterolemia, list its effects, causing agents common hyperlipoproteinemia, Lipoproteins ix. ix. Explain about fatty liver	4
IV	**a) Amino -acid Chemistry & Amino acid and protein metabolism** I. Define and classify amino acids II. Define peptides and explain peptide bonds, list the biologically important peptides. III. Define and classify proteins, enumerate functions of proteins. IV. Define Catabolism of amino acids- transamination, deamination V. Illustrate fate of ammonia, transport of ammonia, Urea cycle	3 2

	VI. Outline the specialized products formed from amino acids **b) Hormones** Hormones basic concepts in metabolic regulation with examples (Insulin)	
V	**a) Vitamins** I. Define vitamins and classify them according to solubility II. List the sources, Coenzyme forms, functions, Recommended Dietary Allowance (RDA) III. Tell about digestion, absorption and transport, deficiency and toxicity of individual vitamins **b) Mineral metabolism** IV. Define minerals and list the sources for mineral and their Recommended Dietary Allowance V. Tell about digestion, absorption, transport, excretion of various minerals VI. List the functions and disorders of individual minerals – Calcium, phosphate, iron, magnesium, manganese, fluoride, selenium, zinc, molybdenum, copper	4 4
VI	**a) Acid-base balance** I. Define acid, base and pH II. Handerson Hassel Balch equation, indicators III. Define buffers and describe buffer systems of the body (bicarbonate buffer system) IV. Elaborate about the role of lungs and kidneys in acid-base balance. V. Acid base disorders **b) Function Tests** I. Describe the biochemical functions of kidney and the principal Renal Function Tests II. ii. Describe the biochemical functions of liver and the principal Liver Function Tests	4 2

No of Units	PRACTICAL TOPICS – DEMONSTRATIONS	No. OF HOURS
I	a. Lab safety b. Lab apparatus: Glassware, centrifuge, colorimeter, spectrometry, Electrophoresis, Chromatography and Radio isotopes: application in medicine and basic research.	3
II	Sample Collection a. Blood, Anticoagulants b. Random urine sample, 24 hours urine sample, Preservatives	1
III	Preparation of Solutions (Molar, Normal, Percentage and Saturated) Preparation of Buffers, pH determination	2
IV	Reactions of Carbohydrates (Practical) (Glucose, Fructose, Lactose, Sucrose)	3
V	Urine Analysis – Normal constituents (Organic & Inorganic) & Abnormal constituents by Dipstic method (Practical)	2
VI	Clinical Significance of - Blood Glucose, Blood Urea, Serum Creatinine, Electrolytes, Serum bilirubin, Lipid profile and ABG.	4

MEDICAL LAW AND ETHICS

SYLLABUS

Hours: Theory 15

Credits: Theory 01

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.[28]

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".[28] Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are asfollows:

No of Units	TOPICS	No. of Hours
I	1. Medical ethics - Definition - Goal - Scope 2. Introduction to Code of conduct 3. Basic principles of medical ethics – Confidentiality	3
II	4. Malpractice and negligence - Rational and irrational drug therapy 5. Autonomy and informed consent - Right of patients 6. Care of the terminally ill- Euthanasia	3
III	7. Organ transplantation 8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.	3
IV	9. Professional Indemnity insurance policy 10. Development of standardized protocol to avoid near miss or sentinel events	3
V	11. Obtaining an informed consent.	3

CLINICAL EDUCATION – I

No. of Hours 375 Credits-12.5

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.

SEMESTER-III

BASICS OF PATIENT CARE

THEORY: 30Hr and Credits 2

INTRODUCTION:

This course develops knowledge and skills basic to patient care undergoing radiographic procedures. Topics include patient communication, patient assessment, and safety of patient and healthcare provider in the health care facility. Focus extends to include proper body mechanics and patient positioning to promote comforting for patient. Basics of infection control and methods of medical asepsis were focused on especially when dealing with patients undergoing certain invasive procedures. Finally describe and perform basic procedures like injections, Ryle's tube, Foley's catheterization, taking blood samples, wound dressing etc.

COURSE OBJECTIVES:

1. Students will gain understanding of the fundamental concepts of patients care whilein the hospital or undergoing a special procedure.
2. Students will become familiar with some procedures relevant to patient condition
3. Students will Be able to provide certain basic procedures and identify symptoms ofaltered cognition.
4. Students will be able to relate them to patient overall health and well being.
5. Relationship between certain procedures, radiographic procedure, and patient overall health will be emphasized.

SYLLABUS:

LEARNING OUTCOMES:

The main Intended Learning Outcome (ILO) that is measured throughout this course is "Critical Thinking." This ILO is conceptually defined as "a cognitive process that aims at using the rational and logical examination of ideas for the purposes of understanding, problem solving, and decision-making." Critical thinking will facilitate the process of teaching/ learning, which is originally a change in thinking or behaviour.

I- Caring

II- Communication

III- Critical thinking

IV- Therapeutic

interventionV -

Leadership

VI- Employer's satisfaction

NO. of Units	TOPICS	NO. OF HOURS
I	**Describe the principles of careof bedridden patient** - Care of a bedridden patient - Patient assessment - Assessing personal concerns of patient - Assessing physiological needs Assessing current physical status **Describe the basicprinciples of communication** Communication with patients and attendants - Communication skills - Communication with patients - Special circumstances in communication - Patient education - Communication with patient's families Dealing with death and loss	3
II	**Describe and demonstrate techniques to maintain patient hygiene** Patient hygiene - Cycle of infection - Body's defence against infection - Infectious diseases - Maintaining hygiene **Describe and practice infection control measures in the ward and ICU** Infection control measures in the ward and ICU - Microorganisms - Cycle of infection - Hand Washing Preventing disease transmission	3
III	**Describe and record vital data and basic clinicalparameters** Vital data and basic clinical parameters -Assessment of body temperature: sites,equipments and techniques, special considerations - Assessment of pulse: Sites, location ,equipments and technique, special consideration - Assessment of respirations: technique,special Consideration Recording of vital signs **Describe and demonstrate howto monitor patients** Patients monitoring Assessing personal concerns of patient - Assessing physiological needs - History taking - Physical assessment	3
IV	**Describe the principles of patient safety** - Patient transfer - Restraints and immobilization - Accidents and incident reports - Fire hazards Other common hazards **Describe and demonstrate the principles of cleaning, disinfection**	3

	and sterilization in thehospital wards/ ICU - Hand washing: simple, hand antisepsis andsurgical antisepsis (scrub) - Isolation: source and protective -Sterile packs - Surgical scrubbing - Gowning and gloving -Sterilization - Fumigation Autoclaving **Describe the common routesfor drug administration** -Assess the patient's condition - Recognize different definitions associatedwith pharmacology - Recognize various classifications of drugs - Identify the ten rights of drug administration - List out common routes and methods ofdrug administration Perform venipuncture using appropriateuniversal Precautions	
V	**Describe and perform basic procedures** -Injections, -Ryle's tube, -Foley's catheterization, -Taking blood samples, -Wound dressing **Describe and demonstrate documentation of patient related data in thecase sheet records** -History taking data sheet - Documentation: Purpose of Recording and reporting, Communication within the HealthCare Team, - Types of records; ward records, medical/nursing records, Common Record-keeping forms, Computerized documentation **Describe and demonstrate useof basic hospital equipment** Use of basic hospital equipment	3

COURSE OUTCOMES:

1. Perform basic infection control practices in the Healthcare setting.
2. Use effective skills to draw blood and accurately label tubes
3. Perform basic procedures using advanced technique and interpretation.
4. Perform basic patient care skills.
5. Communicate with a diverse patient population using written and oral communication and listening skills in interactions.

REFERENCES:

1. Ehrlich, R., A., McCloskey, E. D., & Daly, J., A. (2004). Patient Care in Radiography with an Introduction to Medical Imaging. Mosby: An Affiliate of Elsevier. Sixth edition.
2. Adler, A., M., & Carlton, R., R. (2007). Introduction to Radiologic Sciences and Patient Care. Saunders: Elsevier. Fourth edition
3. Torres, L.,S. (1989). Basic Medical Techniques and Patient Care for Radiologic Technologists. J. B.Lippincott Company: Philadelphia. Third Edition.

MICROBIOLOGY

INTRODUCTION:

The goal of teaching Microbiology is to provide understanding of the natural history of infection and diseases in order to deal with the Etiology, pathogenesis, Pathogen city, laboratory diagnosis, treatment control and prevention of these infections and infectious diseases.

COURSE OBJECTIVES:

- Plan and interpret Laboratory investigations for diagnosis of infectious diseasesand correlate the clinical manifestations with the etiological agent.
- Perform simple laboratory test which help to arrive at rapid diagnosis.
- Understand methods of disinfection and sterilization and their application to
- Control and prevention of hospital acquired infections.

SYLLABUS

Credits: Theory 04 & Practical 0.5

Hours: Theory 60 & Practical 15

NO. of Units	TOPICS	NO. OF HOURS
I	**General Bacteriology** Morphology • Classification of microorganisms, size, shape and structure of bacteria. • Use of microscope in the study of bacteria Growth and nutrition • Nutrition, growth and multiplication of bacteria Culture media, Culture methods & AST	**4**
	Immunology • Immunity & types of immunity • Antigen & Antibody • Antigen-Antibody reactions • Structure & functions of immune system • Immune response • Hypersensitivity • Autoimmunity • Vaccines & National Immunization schedule	**8**
	Systematic Bacteriology • Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes. Miscellaneous bacteria	**18**
II	**Sterilization and Disinfection**	**2**

	• Principles and use of equipment of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization. • Chemical methods of sterilization (like ETO & Plasma sterilization) Disinfectants and Antiseptic agents used in the hospital.	
	Hospital Infection • HAIs- prevention and control (Standard precautions, Transmission based precautions & Bundle care).	**2**
	Principles and practice of Biomedical waste management	**1**
III	**Parasitology** Morphology, life cycle, laboratory diagnosis of following parasites: • E. histolytica • Free living amoeba • Hydatid disease • Plasmodium • Tape worms • Intestinal nematodes • Somatic nematodes	**10**
IV	**Mycology** • General Mycology • Superficial Mycoses • Subcutaneous Mycoses • Systemic Mycoses • Opportunistic fungi	**5**
V	**Virology** • General Virology • Herpes • Arbo viruses • Influenza, Parainfluenza, Corona • Hepatitis • HIV • Rabies • Poliomyelitis.	**10**

PRACTICALS		
No of Units	**TOPICS**	**NO. OF HOURS**
I	Specimen collection and handling	2
	Microscopy & Hanging drop preparation	1
	Slide preparation and staining • Gram staining • Acid fast staining	3
	• KOH mount • Fungal culture	1
II	Serology • Rapid tests • ELISA demo	1
III	Standard precautions-	1

	• Hand hygiene	
	PPE (donning & doffing)	1
	• Spill management • NSI (Needle stick injury)	1
	• Cough etiquette • Safe injection practices	1
IV	Sterilization & Disinfection of instruments	2
V	Biomedical waste management	1

COURSE OUTCOMES:

- Knowledge about the association of Micro-organisms in Disease and Health Requirement and the common pathogens of Medical importance
- Know about the commonly used Microbiology Laboratory equipment and thecleaning of glassware
- Know about Collection, Transportation and processing of clinical samples forMicrobiological Investigations
- Knowledge about Sterilization and Disinfection practices
- Development of skills of Media pouring
- Slide and Smear preparation
- Performing Staining techniques in Microbiology (Simple staining, Gram'sstaining, AFB staining)

REFERENCES:

- Ananthanarayan and Paniker's Textbook of Microbiology – 10th edition
- Textbook of Microbiology C P Baveja

PATHOLOGY

INTRODUCTION

The goal of teaching Pathology is to provide comprehensive knowledge of the causes and mechanisms of the duties in order to enable to achieve complete understanding of the natural history and clinical manifestation of the diseases.

COURSE OBJECTIVES:

- To describe the rationale and principles of technical procedures of diagnostic laboratorytests.
- To know about basic diagnostic tests and correlate with clinical and morphologicalfeatures of diseases.
- To learn about commonly used bedside tests on blood, urine and other relevant samples.

SYLLABUS

Credits: Theory 4 & Practical 0.5

Hours: Theory 60 & Practical 15

NO. OF Units	TOPICS	NO. OF HOURS
I	**Cell Injury** Adaptations Necrosis Apoptosis Types, Mechanisms of cell injury	4
	Inflammation Signs, Mechanisms, chemical Mediators & outcomes of Inflammation Acute Phase reactants and Granulomatous inflammation	4
	Tissue Repair & Regeneration	1
	Hemodynamics Hyperemia, congestion, edema Thrombosis Embolism Infarction & Shock	5
	Neoplasia Differences between benign & malignant tumors, invasion & Metastasis, features of malignancy, Causes of cancer	3
	Infections TB Leprosy, syphilis HIV Malaria	6

II	**Hematology** Anemia- Definition & classification Iron Deficiency Anemia, Megaloblastic anemia, Hemolytic anemia Blood grouping Causes & definition - Leukocytosis,leucopenia, Leukemoid reaction, BT, CT, PT, APTT, thrombocytosis, thrombocytopenia, splenomegaly	6
III	**GIT- 1** Peptic ulcer, Barrett`s esophagus	1
	Hepatobiliary system Jaundice Cirrhosis-definition & causes, Viral Hepatitis – causes. Modes of transmission	2
	Endocrine Diabetes- subtypes and differences, complications and diagnosis, hypo and hyperthyroidism	2
IV	**Blood vessels** Atherosclerosis HTN –types, causes & diagnosis	2
	CVS Myocardial infarction- etiopathogenesis, Lab diagnosis Rheumatic fever	2
	Lung COPD Asthma, pneumonia	3
V	**Kidney** ARF- definition & causes, CRF- definition & causes Renal stones Classification of renal diseases, congenital abnormalities of urinary system Glomerular diseases: causes, types & pathology (Nephritic , nephrotic syndrome) Tubulointerstitial disorders- ATN, TIN, Pyelonephritis & tuberculous pyelonephritis Renal vascular disorders End stage renal disease: causes & pathology Pathology of kidney in hypertension, pregnancy & diabetes Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes Pathology of urinary tract infections	18

	CNS Meningitis – causes, routes of spread, CSF findings, encephalitis	1
PRACTICALS TOPICS		**NO. OF HOURS**
	Blood Grouping Peripheral smear Urine examination Slides Specimens Charts, interpretation of CBP, BT, CT, PT, APTT Instruments	1 2 2 2 3 4 1

COURSE OUTCOMES:

- At the end, the students shall be able to describe the rationale and principles of technical procedures of diagnostic laboratory tests.
- Interpret diagnostic laboratory test and correlate with clinical and morphologicalfeatures of diseases.
- Perform simple bedside tests on blood, urine and other biological fluid samples.

REFERENCES:

- Pathologic basis of disease – Robbins & Cotran 10th edition
- Pathology – Harshmohan 8th edition
- Textbook of Pathology for Allied Health Sciences – Ramdas Nayak
- Textbook on Pathology for DMLT and Paramedical courses – Dr. I.Clemen
- Essentials of Clinical Pathology – Shirish. M. Kawthalkar 2nd edition

CLINICAL EDUCATION –II

No. of Hours 360 Credits - 12

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.

SEMESTER – IV

PHARMACOLOGY

INTRODUCTION

Basic drug effect, classification of drugs acting on nerves, heart, blood pressure, respiratory system, gastrointestinal system, kidneys, hormones, musculoskeletal system and analgesics etc., Common drugs-effects and side effects and drug interactions.

COURSE OBJECTIVES:

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

SYLLABUS

Credits: Theory 02

Hours: Theory 30

NO. OF UNITS	CONTENT	NO. OF HOURS
I	General Pharmacology 1. Routes of drug ministration	1
	2. Pharmacokinetics, Pharmacodynamics, Factors modifying drug action (FMDA in brief)	2
	3. Adverse Drug Reactions & Drug interactions	1
	4. Therapeutic drug monitoring(TDM), Pharmacogenomics & Drug usage in Special Population	1
II	Drugs acting on Nervous System 1. Cholinergic drugs & Anticholinergic drugs	1
	2. Sympathomimmetics	1
	3. Antiadrenergic drugs & Drugs for Glaucoma	2
	4. Drugs acting on Somatic nervous system- Skeletal Muscle Relaxants	1
	5. General Anaesthetics	1
	6. Local Anaesthetics	1
	7. Sedative – Hypnotics & Ethyl & Methyl Alcohols	1

	8. Opioid analgesics & antagonists, Anti manic dugs-Lithium	1
III	Systemic Pharmacology (Drugs Acting on Cardio Vascular System, Respiratory System, Gastrointestinal System and Blood) 1. Diuretics	1
	2. Antihypertensive drugs	1
	3. Treatment of Angina& Congestive Heart Failure	1
	4. Treatment of Bronchial Asthma	1
	5. Antiemetic drugs	1
	6. Coagulants	1
	7. Anticoagulants& Growth factors	2
IV	Hormones and Related Drugs 1. Treatment of Diabetes Mellitus	2
	2. Corticosteroids	1
V	Chemotherapy and Miscellaneous. 1. Antimicrobials in brief & Immunomodulators	3
	2. Antivirals & Antifungals	1
	3. Drugs used in emergency conditions	1

COURSE OUTCOMES:

At the end of course, students should know about

- Pharmacokinetics and pharmaco dynamic principles of drugs
- Drugs acting on autonomic nervous system
- Drugs modulating autacoids
- Drugs used in cardiovascular and hemodynamic disorders.
- Drugs acting on renal system

REFERENCES:

- Essence of Pharmacology by K.D. Tripathi
- Pharmacology and Pharmacotherapeutics by Satoskar
- Text book of Pharmacology for Allied Sciences – Padmaja Udaykumar

CONCEPTS OF RENAL DISEASE, DIALYSIS & NUTRITION
SYLLABUS
Theory 30 hours Credits 02

NO. OF Units	BASIC CONCEPTS OF RENAL DISEASES TOPICS	NO. OF HOURS
I	• Acute renal failure. • Chronic renal failure.	2
	• .Nephrotic syndrome – primary & secondary. • Nephritic syndrome.	2
	• UTI (urinary tract infections.) • Asymptomatic urinary abnormalities.	2
II	• Obstructive uropathies. • Renal stone diseases. •	2
	• Pregnancy associated renal diseases. • Congenital & inherited renal diseases. •	3
	• Tumors of kidney • Renal vascular disorders & hypertension associated renal diseases.	3

NO. of Units	BASIC CONCEPTS OF DIALYSIS THERAPY TECHNOLOGY TOPICS	NO. OF HOURS
III	1. Definition. 2. Indications of dialysis.	1
	1. Types of dialysis. 2. Principles of dialysis.	1
	3. Haemodialysis apparatus - types of dialyzer & membranes. 4. Dialyzer reuse.	1
IV	1. Types of vascular access for haemodialysis.	1
	5. Introduction to haemodialysis machine. 6. Priming of dialysis apparatus.	1
	1. Common complications of haemodialysis. 2. Monitoring of patients during dialysis.	1

NO. OF UNITS	BASIC CONCEPTS OF NUTRITION	NO. OF HOURS
V	1. Introduction to science of nutrition. a. Definition. b. Food pattern and its relation to health. c. Factors influencing food habits. d. Superstitions, culture, religion, income, composition of family, age, occupation,	10

	special group etc. e. Food selection, storage and preservation. f. Prevention of food adulteration. 2. Classification of nutrients. a. Macronutrients and micronutrients. b. Types, sources, requirements and deficiency of proteins. c. Sources, requirements and deficiency of carbohydrates. d. Types, sources, requirements and deficiency of fats. e. Sources, requirement and storage of drinking water. f. Types, sources, requirements and deficiency of minerals. g. Types, sources, requirements and deficiency of vitamins. 3. Planning of diets. a. Need for planning of diets. b. Concepts of balanced diet. c. Food groups and balanced diet. d. Influence of age, sex, occupation & physiological state. e. Recommended dietary intake. f. Steps in planning balanced diet. g. Concepts of balanced diet for dialysis patients. h. Recommended dietary intake for dialysis patients. i. Planning diet for dialysis patients. **j.** Steps in planning balanced diet for dialysis patients.	

APPLIED DIALYSIS THERAPY TECHNOLOGY – PART I
PHARMACOLOGY RELATED TO DIALYSIS THERAPY TECHNOLOGY
SYLLABUS
Theory 60 hours Credits 04
Practical 120hours Credits 04

NO. OF Units	TOPICS	NO. OF HOURS
I	Indications of dialysis. History & types of dialysis. Theory of hemodialysis : diffusion ,osmosis, ultra- filtration & solvent drag	2 2 4
	a. Hemodialysis apparatus: types of dialyzer & membrane, Dialysate. b. Dialysis Membrane: • Structure, • Characteristics [molecular weight cutoff; • Ultra filteration coefficient (Kuf) ; • Mass transfer coefficient(KoA) and efficiency; • Low and high flux; Clearance(K)] • Bio compatibility • Newer membranes. • High performance membranes.	7
II	Physiology of peritoneal dialysis. Dialysis machines: a. Latest Hemodialysis machine: • Conventional and Portable Machines • Wearable artificial Kidney • The Bio artificial Kidney • Home dialysis machines and patient training b. Mechanism of functioning & management: • Hemodialysis machine. • Peritoneal dialysis machine.	5 7
	Biochemical investigations required for renal dialysis. Anti-coagulation.	3 3
III	Adequacy of dialysis a. Hemodialysis. b. Peritoneal dialysis. Peritoneal equilibration test (PET). Withdrawal of dialysis criteria: a. Acute dialysis. b. Chronic dialysis.	4 4
	Dialyzer reuse. Water treatment system`	2 2
IV	**Pharmacology related to Dialysis Therapy Technology :** IV fluid therapy with special emphasis in renal diseases. Diuretics: classification, actions, dosage, side effects & contraindications. Anti-hypertensives: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension.	4

	Drugs & dialysis: dose & duration of administration of drugs. Dialyzable drugs: phenobarbitone, lithium, methanol etc Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value. Erythropoietin in detail.	4
V	Heparin, low molecular weight heparin and heparin-induced thrombocytopenia Protamine sulphate as antidote and indication Alternative anticoagulants.	3
	Formalin, citrate, sodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin. Hemodialysis concentrates: composition & dilution (acetate & bicarbonates). Peritoneal dialysis fluid in particular hypertonic solutions: composition. Potassium exchange resins with special emphasis on mode of administration	4

NO. OF UNITS	PRACTICAL TOPICS	NO. OF HOURS
I	**Introduction of Hemodialysis** History, Principles, Indications, Types of HD Dialysis Team(Doctor, Nurse, technician, Renal Dietitian)	30
II	**Water Treatment** Purpose of water treatment, Filtration, Softener and carbon Filtration, Deionizer, R.O System ,Ultrafiltration	30
III	**Vascular access** History of access ,Types of access, Technique of cannulation, Access Management ,Complications ,Vascular access, recirculation	20
IV	**Equipment of dialysis** ➢ Hemodialysis equipment ➢ Peritoneal Dialysis equipment	20
V	**Dialysis efficiency** ➢ Weight ➢ Adequacy in dialysis ➢ Renal diet	20

Clinical Education – III

No. of Hours 300 Credits 10

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.

SEMESTER-V
APPLIED DIALYSIS THERAPY TECHNOLOGY – PART II
SYLLABUS
Theory 60 hours Credits 04
Practical 120 hours Credits 04

NO. OF UNITS	TOPICS	NO. OF HOURS
I	1. Dialysis in special situations: a. Patients with congestive cardiac failure. b. Advanced liver disease. c. Patients positive for HIV, HBsAg & HCV. d. Failed transplant. e. Poisoning cases. f. Pregnancy.	15 3 3 3 2 2 2
II	1. Dialysis in infants &children.	5
III	2. Special dialysis procedures: a. Continuous therapies in hemodialysis. b. Different modalities of peritoneal dialysis. c. Haemodiafiltration. d. Hemo perfusion. e. SLED. f. MARS.	13 3 3 2 2 2 1
IV	1. Plasmapheresis	7
	3. Special problems in dialysis patients: a. Psychology & rehabilitation. b. Diabetes c. Hypertension. d. Infections. e. Bone diseases. f. Aluminum toxicity.	10 1 2 2 2 2 1
V	1. Renal anemia management: chronic dialysis.	10

PRACTICAL TOPICS	NO. OF HOURS
Setting up dialysis machine for dialysis.	8
Equipment of dialysis 1. Hemo dialysis equipment	8 7

2. Peritoneal dialysis equipment	
1. Initiation of dialysis through central venous catheters like internal jugular, femoral & subclavian vein. 2. Packing & sterilization of dialysis trays. Closing of dialysis. 3. Isolated ultrafiltration. 4. Preparation of concentrates depending on the situations. 5. Reuse of dialysis apparatus.	8 6 7 6 7 8
Water treatment Purpose of water treatment, loop disinfection	10
1. Vascular access 2. AV fistula cannulation 3. AV graft cannulation	10 8 8
1. Hemo Dialysis efficiency 2. Peritoneal dialysis efficiency	10 9

CLINICAL EDUCATION – IV

No. of Hours 360 Credits - 12

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.

SEMESTER VI
APPLIED DIALYSIS THERAPY TECHNOLOGY – PART III
SYLLABUS
Theory 60hrs Practical's - 120
Credits 04 Practical 04

NO. OF Units	TOPICS	NO. OF HOURS
I	1. Vascular access for hemodialysis & associated complications. Peritoneal access devices: types of catheter, insertion techniques & associated complications.	8
II	• Complications of dialysis: • Hemodialysis : acute & long – term complications. • Peritoneal dialysis: mechanical & metabolic complications.	 6 8
III	• Peritonitis & exit site infection.	5
IV	1. Recent advances and research in hemodialysis. • Nocturnal dialysis. • Online dialysis. • Daily dialysis	10
V	2. Tele medicine in dialysis practice.	7
	1. Introduction to kidney transplantation immunology, procedure and Immunosuppressive medications. 2. Live donor and cadaver transplantation; paired exchange transplantation and ABO incompatible transplantation; transplant in sensitized recipients.	8 5

PRACTICAL TOPICS	NO. OF HOURS
Complications of Hemodialysis Complications of peritoneal dialysis	8 8
Procedures in dialysis unit Femoral vein catheterization Assisting biopsy Assisting jugular vein catheterization Assisting perm catheterization	8 7 3 6 4
Vascular access management AV fistula cannulation techniques Setting up of dialysis therapy through central venous catheter • Internal jugular vein • Femoral vein • Sub clavian vein	8 6 7

1. Performance of peritoneal dialysis exchange manually. 2. Setting up of automated peritoneal dialysis equipment.	10 9
1. First assistant in minor procedures. 2. Skin suturing. 3. CPR demonstrations.	10 8 8
Introduction to tissue typing laboratory and witness metrology for1) HLA tying methods, tissue cross-match (X-match), panel reactive antibodies (PRA) and Detection of donor specific antibodies (DSA).	10

CLINICAL EDUCATION – V

No. of Hours 360 Credits - 12

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technology skills.