JAMIA HAMDARD

DEPARTMENT OF PARAMEDICAL SCIENCES

CBCS ENABLED SYLLABUS
BSc. Dialysis Techniques

SYLLABUS FOR BSC.

Dialysis Techniques

Choice Based Credit System (CBCS)

Approval Date: 24th September 2019

DEPARTMENT OF PARAMEDICAL SCIENCES
JAMIA HAMDARD

Deemed to be University
Accredited in 'A' Grade by NAAC
Declared to be designated as Institute of Eminence (IoE) by MHRD, GOI
NEW DELHI 110062
www.jamiahamdard.edu

PROGRAM NAME: BSc. Dialysis Techniques

PROGRAM CODE: BDT-321
ACADEMIC SESSION OF INTRODUCTION OF THE PROGRAMME: (2022-2023)
SCHOOL NAME: SNSAH
DEAPRTMENT NAME: DEPARTMENT OF PARAMEDICAL SCIENCES

APPROVAL DATE OF THE BOARD OF STUDIES (B.O.S) MEETING FOR THE PRESENT SYLLABUS **24th SEPTEMBER 2019**

APPROVAL DATE AND NUMBER OF ACADEMIC COUNCIL OF MEETING FOR THE PRESENT SYLLABUS
39th AC (26th SEPTMEBER 2019)

JAMIA HAMDARD, NEW DELHI - 110062
Internal Quality Assurance Cell (IQAC)

SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH

Vision Statement:
To create an institute of national and international repute in Paramedic offering state of the art education entailing the finest skills combined with compassionate patient care.

Mission Statements:
MS1: To provide a quality paramedical education and prepare human and competent global Paramedic professionals.

MS 2: To provide highest level of quality patient care and can make contribution towards education and research.

MS 3: To provide the most advanced and comprehensive course offerings to health sciences students possible by employing the most qualified faculty, utilizing the most advanced technology.

DEPARTMENT OF PARAMEDICAL SCIENCES

Vision Statement (Department/Centre Level):

Academic excellence in education, research, and health care by grooming into highly skilled health professionals and faithful experts fully committed to serve the society.

Mission Statements (3 to 4) (Department/Centre Level):

MS1: To impart basic, theoretical, practical, and professional knowledge of high quality for overall holistic growth of every student.

MS 2: To develop innovative educational activities and participate in public health reforms through training, research and intervention in the field of allied health sciences.

MS 3: To strive to uphold a future generation with high academic standards.

QUALIFICATION DESCRIPTORS (QDs)

Upon the completion of B.Sc. Dialysis Techniques Programme:

QD-1 The student will be able to know what dialysis and its types is.

QD-2 The student will learn the different procedures in the dialysis unit.

QD-3 The student should be able to understand the process of reusing the dialyzers, handling of different equipment in dialysis unit.

QD-4 The student should be able to remember the steps of priming of dialyzer, steps of reprocessing of dialyzer and steps of termination.

QD-5 The student should be able to perform the different procedures required by the dialysis unit like primming dialysis circuit ,cannulation , central line insertion and peritoneal dialysis etc

Mapping Qualification Descriptors (QDs) with Mission Statements (MS)

	MS-1	MS-2	MS-3
QD-1	2	2	2
QD-2	1	2	2
QD-3	3	2	2
QD-4	2	1	1
QD-5	3	2	2

3 for high level mapping, 2 for medium level mapping and 1 for low level mapping.

PROGRAM LEARNING OUTCOMES (PLOs)

After completing this Course, -

PLO-1 The student should be able to know the dialysis therapist roles and responsibilities.

PLO -2 The student should be able to understand and communicate with the kidney disease patient to come out from the denial phase.

PLO -3 The student wilL learn the team work power of the health care provider.

PLO -4 The student will be able to remember the ethics and accountability at all levels(clinical , professional, personal and social)

PLO -5 The student will be able to perform different forms of dialysis procedures in the dialysis unit according to the condition of patient.

PLO -6 The studenr will be able to learn leadership and mentorship

PLO -7 The student will be able to understand social accountability and responsibility

PLO -8 The student will acquire scientific attitude and lifelong learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After completing this Course, the students should be able to …….

PSO-1 Know the principles of dialysis and skills neccessary to provide safe and effective care to the patient undergoing hemodialysis treatment .

PSO-2 Learn the use and maintenance of hemodialysis equipment and alternate dialysis procedures.

PSO-3 Understands the funtion as a dialysis professional under the supervision of the physician or nephrologist in a dialysis facilities .

PSO-4 Remember the steps of management for any complication with a knowledge of the underlying problems and recognise the need to report the complications to the superiors.

PSO-5 Perform the duties of dialysis therapist by giving patient care and also support the patient with emotionally and morally.

Mapping of Program Learning Outcomes (PLOs) With Qualification Descriptors (QDs)

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	3	2	2	2	3
PLO-2	3	1	1	1	2
PLO-3	2	3	2	1	2
PLO-4	2	1	2	2	1
PLO-5	3	1	1	2	1
PLO-6	2	1	2	1	1
PLO-7	2	1	2	2	2
PLO-8	1	1	2	2	2
PSO-1	3	3	2	3	2
PSO-2	3	3	2	2	1
PSO-3	2	2	3	2	2
PSO-4	2	3	1	3	2

3 for high level mapping, 2 for medium level mapping and 1 for low level mapping.

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to …….

CLO-1 Discuss the anatomy and physiology of kidney .

CLO-2 Differentiate between acute and chronic renal failure, discussing causes of each.

CLO-3 Identify related diagnostic tests and treatment modalities.

CLO-4 Prepare the hemodialysis machine for the hemodialysis treatment, including setting up, testing, recirculating, setting parameters, tearing down, cleaning and disinfecting.

CLO-5 Implement safety and emergency measure for dialysis patients and self.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO 1	3	2	2	3	2	3	2	1	1	2	1	1	1	2	2	2
CLO 2	3	2	2	2	3	1	2	2	3	3	2	2	2	1	1	2
CLO 3	2	3	2	2	2	3	1	1	1	1	1	2	2	1	1	1
CLO 4	3	1	3	2	2	1	2	2	3	1	2	1	3	3	1	2
CLO 5	2	1	2	2	3	3	1	2	2	2	1	2	3	2	2	1

BYE-LAWS

The BSc. Dialysis Technology Course is of 3 ½ years duration. The aim of the course is to impart basic medical knowledge, patient care, dialysis machines and dialysis process. On completion of the course the candidate will have complete knowledge about dialysis and will be able to manage patient, trouble shooting of machines and organize and run the dialysis unit with skill.

a.	Name of the Course	**Bachelor in Dialysis Techniques**
b.	Nature	Regular
c.	Duration	Minimum: Three Years & a half (six months compulsory rotatary internship included) (3 ½ years full time Integrated Program, Lateral entry in third semester for students with two yearDiploma
d.	Medium of Instruction and Examinations	English
e.	**Eligibility Criteria**	
	Educational Requirements	Eligibility for the admission : must have passed in 10+2 or equivalent qualification with science discipline from a recognized institution with 50% aggregates Those in possession of central/state recognized two year diploma will be permitted lateral entryinto fourth semester
f.	Commencement of the course	July of every year

h.	Mode of Admission	Admission to the course will be made on the basis of the merit determined by the score of CET conducted by Jamia Hamdard. Students who have appeared in NEET after interview can also be given admission. For admission against the foreign national/NRI/Industry sponsored seats, students will be required to appear only in interview conducted by Jamia Hamdard.
i.	Period of Completion (Span Period)	Not more than 06 years
J.	Fees	As per university norms
k.	Total Number of Students per year	25
l.	Total number of Semesters and examinations	Six Semesters and Semester Examination in every December and May
m.	Total Theory Papers	14+ 01 assignment+04 qualifying exams
n.	Total Credits	41
o.	Minimum Average Pass Marks	50% in each subject, Grade E

COURSE CURRICULUM

Course Structure

The course work shall be divided into six semesters as given below:

Semester-I	July to mid-December
Semester-II	January to mid-May
Semester-III	July to mid-December
Semester-IV	January to mid-May
Semester –V	July to mid-December
Semester –VI	January to mid-May

During an academic year, a candidate shall be enrolled only for one course of study and shall notappear at any other examination of this or any other University.
The semester-wise course outline, total marks allocated to each course, internal assessment and semester examinations marks for all specialization are listed in Annexure.
Detailed course contentof the syllabus shall be prescribed by the Board of Studies (BOS) and shall be reviewed periodically.

The BOS, depending on circumstances prevailing in the market, may change any paper andincrease or decrease the number of optional papers.

Attendance

i. All students must attend every lecture delivered, however, to account for the late joining or other such contingencies, the attendance requirement for appearing in the semester examinations shall be a minimum of 75% of the total classes actually held.
ii. In order to maintain the attendance record of a course, a roll call will be taken by the teacher in every scheduled lecture.
iii. Attendance on account of participation in the prescribed functions of NCC, NSS, Inter- University sports, educational tours/field work assigned by the university to students shall be credited to the aggregate, provided the attendance record, duly counter signed by the officer in-charge, is sent to the Head of Department within two weeks' time after the function/activity.
iv. The teacher in-charge will consolidate the attendance record for the lectures for each student. The statements of attendance of students shall be displayed on the Department's Notice Board by the teacher concerned at the beginning of the following month and consolidated attendance before the conclusion of each semester as given in the University Calendar. A copy of the same shall be sent to the Head of Department for record. Notices displayed on the Notice Board shall be deemed to be a proper notification, and no individual notice shall be sent to students.
v. If a student is found to be continuously absent from the classes without information for a period of 30 days, the teacher in charge shall report it to the Head of Department, who will inform the Registrar through the Dean. Registrar will issue a notice to such student, as to why

his/ her admission should not be cancelled. The Registrar will take a decision on cancellation of admission within 30 days of issue of the notice. A copy of the order shall be communicated to the student.

vi. A student with less than 75% attendance of the lectures in each course shall be detained from appearing in the semester examination of that course. The Dean of Faculty concerned may consider application for the condo nation of shortage of attendance up to 5% on account of sickness or any other extra ordinary circumstances, provided the medical certificate duly certified by registered Medical Practitioner, had been submitted within 7 days of the recoveryfrom the illness.

A student detained on account of attendance will be re-admitted to the same class in the next academic year on payment of current fees except Enrolment and identity card fees

Internal Assessment

Internal assessment for 25 marks in respect of theory papers will be based on written tests,assignments, presentations, viva-voice etc.

i. The evaluation shall be done by course instructors and marks will be notified within a week of such test.

ii. There shall be two written tests in each course in a semester. The test will be conducted as per the academic calendar individual faculty member to announce the date for tests or conduct them as per academic calendar.

iii. The teacher concerned shall maintain records of marks of various components of evaluation for each student and the same will be confidential and notified at the end of the semester.

iv. The internal assessment marks shall he submitted by head of the Department to the Registrar at the end of the semester.

v. A candidate who has to reappear (as an ex-student) in the semester examination of a course will retain the marks of internal assessment.

vi. A student who will be required to seek re-admission, for whatever reason, will have to appear for internal assessment and tests afresh.

Semester Examinations

i. The Semester examinations shall be held at the end of each semester as notified in the academic calendar. There shall be no supplementary examination. Candidates shall appear in the examination of their uncleared papers in the next semester examination of the same paper along with other students of junior batch. Thus, the uncleared papers of Semester - I shall be cleared in Semester- III and those of Semester - II in Semester-IV. Likewise, the examination of uncleared papers of semester V and VI would be taken up by the student next year along with the junior batch.

ii. The duration of semester examinations of each theory paper will be 3 hours.

iii. The question papers shall be set by either an external or an internal examiner duly appointed by the Board of Studies and approved by the Vice Chancellor.

iv. The papers set by the examiners shall be moderated by a panel of moderators constituted by the Board of Studies at the time of approving the panel of examiners.

v. The minimum pass marks shall be 50% (grade E) in each theory and viva-voce (combined examination).

vi. Every candidate shall have to prepare a project study / assignment in the Sixth semester. The subject of project/assignment shall be approved on the recommendations of the supervisor(s) and the Head of the Department.

vii. A student shall be required to maintain record of periodic progress in the project in a diary. He / she should be in constant touch with his/her supervisor and obtain his/her signature in the diary regularly. There would be continuous appraisal of the project.

Promotion Criteria

i. A student shall be promoted to semester-III if he/she has secured at least 50% marks each inat least 6 subjects out of 10 prescribed in Semester - I and Semester - II taken together.

ii. No student shall be promoted to Semester –V if he/she has more than 04 uncleared papers of the preceding semesters taken together.

iii. After the declaration of the semester-VI results, if a student has any paper uncleared of any semester, he/ she will have to reappear in these papers in concerned semester in next academic year as an ex-student along with the next batch.

iv. The degree will be granted only after clearing all the semester examination and completion ofsix months compulsory internship.

v. For all the papers labeled as qualifying exams the student needs to clear these papers during the span period to be awarded the degree

Span Period
A student must complete all the requirements of degree within a period of Six years from his/ heradmission.

Grading System
The grade awarded to a student in any particular course will be based on his/her performance in sessional and final examinations combined together. The letter grades and their equivalent numerical points are listed below:

% Of Marks Scored	Grade	Grade Points	Description of Performance
80% or more	A+	10	Outstanding
75% or more but less than 80%	A	9	Excellent
70% or more but less than 75%	B	8	Very Good
60% or more but less than 70%	C	7	Good
50% or more but less than 60%	D	6	Average
45% or more but less than 50%	E	5	Fail
Absent/ Detained	I	-	Incomplete

Earned Credit (E C)

The credit for the course in which a student has obtained "D" or a higher grade will be counted ascredits earned by him/ her. Any course in which a student has obtained "I" grade will not be counted towards his/ her earned credits

Evaluation of Performances

i. SGPA (Semester Grade Point Average) will be awarded on successful completion of each semester
ii. CGPA (Cumulative Grade Point Average) which is the grade point average for all the completed semester at any point in time, which will be awarded in each semester on successful completion of the current semester as well as all of the previous semester. CGPA is not applicable in semester I.

Calculation of SGPA and CGPA in a semester

$$\text{SGPA} = \frac{\sum_{I}^{n} (\text{Earned Credits} \times \text{Grade Point})}{\sum_{I}^{n} (\text{Course Credits Registered})}$$

Where 'n' is the number of subjects/papers registered

$$\text{CGPA} = \frac{\sum_{I}^{m} \sum_{I}^{n} (\text{Earned Credits X Grade Point})}{\sum_{I}^{m} (\text{Course Credits Registered})}$$

Where 'm' is the number of semester passed

For Example

Semester - I

Course name	Subject Credits	Marks	Grade Awarded	Grade Point	Points secured (Subject credits x grade point)
101	3	56	D	6	18
102	3	65	C	7	21
103	3	55	D	6	18
104	3	68	C	7	21
105	3	62	C	7	21
TOTAL	**15**	306		**33**	**99**

Total credits =15
Points secured= 99

SGPA=99/15 = 6.6

Semester II

Course name	Subject Credits	Marks	Grade Awarded	Grade Point	Points secured
201	3	63	C	7	21
202	3	62	C	7	21
203	3	76	A	9	27
204	3	55	D	6	18
205	3	61	C	7	21
TOTAL	**15**	**317**		**36**	**118**

Total credits= 15

Points secured= 118

SGPA=118/15= 7.80

CGPA= 217/30=7.23

Classification of successful candidates:

The result of successful candidates who fulfil the criteria for the award of degree shall beclassified at the end of last semester, on the basis of his/her CGPA

Classification shall be done on the basis following criteria: -

i. He/ she shall be awarded "Distinction" if her/ his final CGPA is 9 and above and passed all the semester examinations in the first attempt
ii. He/ she shall be awarded "First Division" if her/ his final CGPA is 6.75 and above but lessthan 9.00
iii. He/ she shall be awarded "Second Division" if her/ his final CGPA is 6.00 and above but lessthan 6.75.
iv. He/ she shall be awarded "Pass" if her/ his final CGPA is 5.00 and above but less than 6.00
v. He / she shall be treated as "Fail" if his/ her final CGPA is less than 5.00

Note: One credit hour is equal to 25 hours of teaching for theory as well as practical. Credits for theory given against the subject in the course syllabus

SEMESTER-I

Course Code: 101(Theory) & 103(Practical)

Title of the Course: Human Anatomy

L-50, P-20 **Credits (L=2, P=1): 3**

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to

CLO-1- Know the biology concerned with the study of the body structure of organisms and their parts.

CLO-2- Learn the different parts of the human body

CLO-3- Understand the Preservation, and, embalming of body organs

CLO-4- Remember the study of bones, joints ,and muscles

CLO-5- perform to make general slides of tissues & organs

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	1	1	1	2	2	1	1	1	2	1	1	1	2	1
CLO2	1	1	1	1	1	2	2	1	1	1	1	1	1	1
CLO3	1	1	1	2	1	1	1	1	1	2	2	1	2	1
CLO4	1	1	1	2	1	1	1	1	1	2	2	1	2	1
CLO5	1	1	1	2	2	1	1	1	2	1	1	1	2	1

Detailed Syllabus: **12 Hours**

UNIT-I

Introduction to Anatomy

Anatomical terms, planes, organization of human body- cell, tissue, organ & organ system.

Musculo-skeletal system:

Types of bones, structure & divisions of the skeleton system, name of all the bones and their parts, joints- classification. Structure and types of muscles

Anatomy of the Nervous system

Central nervous system & Peripheral nervous system- different components

UNIT-II **15 Hours**

Anatomy of Circulatory system:
General plan of circulatory system and its components-
Heart- size, location, coverings, chambers, blood supply, nerve supply, the blood vessels
General plan of circulation, pulmonary circulation
Name of arteries and veins and their positions Lymphatic system - general plan Anatomy of the Respiratory system:
Organs of Respiratory System (Brief knowledge of parts and position)

UNIT-III **13 Hours**

Anatomy of the Digestive system:
Anatomy of alimentary tract; Parts of the tract
Accessory glands of digestion; Pancreas, Liver, Gall Bladder
Anatomy of Excretory system Kidneys- location, gross structure, excretory ducts, ureters, urinary bladder, urethra

UNIT-IV **10 Hours**

Reproductive system
Male Reproductive System
Female Reproductive System Anatomy of the endocrine system
Name of all endocrine glands their positions, Hormones and their functions- Pituitary, Thyroid, Parathyroid, Adrenal glands, Gonads & Islets of pancreas

BDT-103 Practical-

Practical based on syllabus mentioned in theory subjects.

Reference Books:

1. Human Anatomy Regional and Applied Vol. 1, Vol.2 & Vol.3, B.D.Chaurasia C.B.S. Publishers, New Delhi
2. Handbook of General Anatomy B.D.Chaurasia, C.B.S. Publishers, New Delhi
3. Textbook of Human Histology Inderbir Singh, Jaypee Brothers, Medical Publishers, Delhi
4. Gray's Anatomy Susan Standring, Elsevier Churchill Livingstone, Edinburg

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: 102(Theory) & 104(Practical)

Title of the Course: Human Physiology

L-50, P-20 **Credits (L=2, P=1): 3**

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to .

CLO-1-Know how to assess Blood pressure, heart rate, pulse rate, respiratory rate, reflexes.

CLO-2- Understand the bleeding time and clotting time.

CLO-3-Remember the count of RBC, WBC, Platelet count.

CLO-4- Remember Blood Groups - ABO and RH grouping estimation.

CLO-5- Perform Hemoglobin test.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	1	1	1	2	2	1	1	1	2	1	1	1	2	1
CLO2	1	1	1	1	1	2	2	1	1	1	1	1	1	1
CLO3	1	1	1	2	1	1	1	1	1	2	2	1	2	1
CLO4	1	1	1	2	1	1	1	2	2	1	2	2	1	1
CLO5	2	1	1	1	1	2	1	2	1	1	1	1	2	

Detailed Syllabus:

UNIT-I **12Hours**

General Physiology

Cell, Transport across cell membrane, homeostasis, resting membrane potential, action potential

Blood

Composition and functions of Blood

RBC, WBC, Platelet count, Hemoglobin

Blood Groups - ABO and RH grouping

Hemostasis & Anticoagulants

UNIT-II **15 Hours**

Cardi-vascular system
Cardiac muscle, Pacemaker & conducting tissue
Cardiac Cycle
Cardiac output, Heart rate, ECG
Arterial blood pressure
Respiratory System
Functions of Respiratory system
Mechanism of respiration, lung volumes & capacities

UNIT-III **13 Hours**

Nerve & Muscle physiology
Neuron structure & properties
Neuromuscular junction
Skeletal muscle structure mechanism of contraction
Cerebrospinal Fluid (CSF): Composition, functions & Circulation.
Central & autonomic Nervous system Organization of CNS
Functions of various parts of Brain, in brief
Composition, functions and circulation of CSF
Differences between sympathetic and parasympathetic division

UNIT-IV **10 Hours**

Digestive system
Functional Anatomy, organization & innervations
Composition and functions of all Digestive juices
Digestion & Absorption of carbohydrates, proteins and fats
Excretory System
Kidneys: Functions, Nephron, Juxta-glomerular Apparatus
Renal circulation
Mechanism of Urine formation
GFR
Endocrine and Reproductive systems Endocrine glands & hormones secreted
Functions of Reproductive system
Male Reproductive System: spermatogenesis, Testosterone.
Female reproductive system: Ovulation, Menstrual cycle.
Pregnancy test

BDT-104 Practical-

Practical based on syllabus mentioned in theory subjects.

Books recommended

1. Textbook of Guyton (Arthur C) Prism Publishers Bangalore.
2. Review of medical Ganong Appleton and Physiology, Lange.
3. CC Chatterjee's Human Physiology, 14th Edition, Volume 1

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: 105

Title of the Course: Medical Ethics, Legal aspects, and Medical Terminology

L-5, P-0 **Credits: 00**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The goal is to have the knowledge of the subject that is to prepare students for the Ethical, Moral, and Legal responsibilities they might encounter in their subsequent coursework, in their clinical rotations and ultimately in their roles as health care professionals.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	1	1	1	2	2	1	1	1	2	1	1	1	2	1

Detailed Syllabus: **25 HOURS**

Role Definition and Interaction, Ethical, Moral, and Legal Responsibilities

Medical terminology- The course employs a body systems-oriented, word-analysis approach to learning medical terminology.

The goal of the class is to prepare students for the terminology they might encounter in their subsequent coursework, in their clinical rotations and ultimately in their roles as health care professionals.

Book references:

1. Medical Ethics-A Reference Guide for Guaranteeing Principled Care and Quality By Eldo Frezza- 1st Edition
2. Medical Ethics: A Clinical Textbook and Reference for Health Care Professionals by Natalie Abrams., Michael Buckner.

Teaching-Learning Strategies-

1. Typical teaching is giving lectures to large groups of students, followed by tutorials and workshops, as well as some individual study.
2. Other delivery methods that can be highly effective, and you may have heard of concepts like flipped classroom and problem-based learning.
3. Different assessment scales is used like internal assessment, external assessment, seminars and different type of quiz.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 13 marks which is assessed on the sessional exam score of the student. It can be best of two sessional exam or average of two sessional exam.
3. External Assessment is of 37 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 50 marks which is made by the sum up of IA+ EA.

Course Code: 106

Title of the Course: English

L-25, P-0 **Credits: 00**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1-This course is designated to help the students to knw how to acquire a good command over English language for common and medical terminology used in medical practice.
CLO-2-Understand how to speak and write proper English
CLO-3-Ability to read and understand English
CLO-4-Ability to understand and practice medical terminology

Mapping of Course Outcomes (CLOs) with Program learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	2	1	1	2	2	1	1	1	2	1	1	1	2	1
CLO2	2	1	1	1	1	2	2	1	1	1	1	1	1	1
CLO3	1	1	2	1	1	1	1	2	1	2	1	2	2	1
CLO4	1	2	1	1	2	1	1	1	1	1	1	1	1	2

Detailed syllabus:

It is designated to help the students to acquire a good command over English language for common and medical terminology used in medical practice. Objectives: Ability to speak and write proper English Ability to read and understand English Ability to understand and practice medical terminology

Book references:

1. English Language & Communication skills by Michaela Denison-George.
2. Good Practice Communication Skills in English for the Medical Practitioner. By Marie McCullagh and Ros Wright.

Teaching-Learning Strategies

1. Typical teaching is giving lectures to large groups of students, followed by tutorials and workshops, as well as some individual study.
2. Other delivery methods that can be highly effective, and you may have heard of concepts like flipped classroom and problem-based learning.
3. Different assessment scales are used like internal assessment, external assessment, seminars, and different type of quiz.

Assessment methods and weightages in brief (4 to 5 sentences)

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 13 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 37 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 50 marks which is made by the sum up of IA+ EA.

Course Code: 107

Title of the Course: Computer Skills

L-5, P-30 **Credits: 00**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1- At the end of the subject, the student will be able undertsand and perform computer applications related to medical records and information system.

Mapping of Course Outcomes (CLOs) with Program learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	1	1	1	2	2	1	1	1	2	1	1	1	2	1

Detailed Syllabus:

Computer Application related to Dialysis student

Book references:

1. Textbook of Computer for Nurses & Allied Sciences by Sudhakar Paraduman Singh.

Teaching-Learning Strategies-

1. Typical teaching is giving lectures to large groups of students, followed by tutorials and workshops, as well as some individual study.
2. Other delivery methods that can be highly effective, and you may have heard of concepts like flipped classroom and problem-based learning.
3. Different assessment scales are used like internal assessment, external assessment, seminars, and different type of quiz.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 13 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 37 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 50 marks which is made by the sum up of IA+ EA.

SEMESTER-II

Course Code: BIO-201 (Theory) BIO-204 (Practical)

Title of the Course: Biochemistry

L-25, P-20 **Credits: (L=1,P=1, T=0) 2**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The course is design to give knowledge about the biochemistry related to the kidney disease.

CLO-2-The student will learn about the tests done in the kidney disease patient.

CLO-3- The student should be able to understand why biochemistry tests are done in dialysis patient.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	1	1	1	2	1	1	3	1	2	1	2	1	2	1
CLO2	1	1	2	1	3	2	2	1	1	1	2	1	1	1
CLO3	2	1	1	1	1	2	1	1	3	1	1	1	2	1

BIO-201 Biochemistry (Theory) **8 hours**

Unit 1- Basics of substances, solutions Atom, Molecule, Ion, Solute, solvent, Concentration of a solution, concentration gradient Solution, substances move in a solution, Membranes Diffusion, osmosis, filtration, convection, conduction Pressure of fluids, hydrodynamic pressure How to measure concentration of substances in a solution, pressure in a solution Membrane, permeably of a membrane, semi permeable, membranes, biological membranes.

Unit 2- **8 hours**

Solution, pH, pH Regulation Disturbance in acid Base Balance Anion Gap, Metabolic acidosis, alkalosis, Respiratory acidosis alkalosis Basic Principles and estimation of Blood Gases and pH Basic principles and estimation of Electrolytes Water Balance, Sodium regulation, Bicarbonate buffers Calorific Value, Nitrogen Balance, Respiratory Quotient, Basal metabolic rate, Dietary Fibers.

Unit 3- **8 hours**

Nutritional importance & biochemical structure of lipids, carbohydrates and proteins, Vitamins, Metabolism of Carbohydrates, Lipids and Proteins.

Unit 4- **6 hours**

Organ function tests- KFT, LFT etc

BIO-204 Biochemistry (Practical)

Practical based on syllabus mentioned in theory subjects.

Recommended Books:

1. VARLEY, Clinical Chemistry, William Heinemann Medical Books Ltd and Inter Science Book. Inc. New York.
2. TEITZ, Clinical Chemistry, W.B. Saunders Company Harcourt (India) Private Limited New Delhi-110048.
3. KAPLAN, Clinical Chemistry, C.V. Mosby Company, St. Louis Washington, D.C. Toronto.
4. RAMKRISHAN (S), PRASANNA (KG), RAJAN (R), Textbook of Medical Biochemistry, Orient Langman, Bombay.
5. VASUDEVAN (DM) and SREE KUMARI (S), Test Book of Biochemistry for Medical Students, Jaypee Brothers, New Delhi.
6. Biochemistry, U. Satyanarayan, Books and Allied (P) Ltd. Kolkata700009(India)
7. DAS (Debajyothi), Biochemistry, Academic Publishers Calcutta.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: GFC-202 (Theory) GFC-205 (Practical)

Title of the Course: Pathology

L-30,P-20 **Credits: (L=1,P=1, T=0) 2**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the pathology's role in diagnosis, staging and management of diseases.
CLO-2-The student will learn about the classifications of diseases of various body systems and how they manifest clinically and histopathologically.
CLO-3-The student should be able to understand the basic nature of diseases processes.
CLO-4-The student should be able to explain the causative agent of the disease.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	1	1	1	2	1	1	3	1	2	1	2	1	2	1
CLO2	1	1	2	1	3	2	2	1	1	1	2	1	1	1
CLO3	2	1	1	1	1	2	2	1	2	1	1	3	1	1
CLO4	1	1	1	1	2	3	1	1	1	2	2	1	1	2

GFC-202 Pathology (Theory)

Unit 1- **05 hours**

Collection of Blood Anti Coagulants Coagulation Profile; method and principles; Advantages and disadvantages Clot Retraction time; Bleeding Time, clotting time.

Unit 2- **15 hours**

Blood Groups: Introduction; ABO Blood Groups in heritance of ABO Group; Techniques of Blood Grouping: Slide Method; Tube Method; Bombay; Phenotype; Clinical Significance; Minor Blood Groups Rh – Typing: Techniques of Rh Grouping; Rh-Incompatibility; Erythroblastosis foetal is (HDN); Rh - Immunization; D4 -Antigen. Transfusion reactions and complications of blood transfusion Blood Components; Packed red cells; Platelet

Concentrate-Appropriate uses; Granulocyte concentrate; appropriate uses; Fresh Frozen Plasma (FFP); appropriate uses; Factor VIII and Factor IX concentrate and appropriate uses; Cryoprecipitate and appropriate uses; Albumin; and immunoglobulin and other products.

Unit 3- 10 hours

Terminologies, Cell Injury, Degenerations, Cell death & Necrosis, Inflammation, Healing, Tuberculosis, Typhoid, Thrombosis- briefly, Embolism- briefly, Ischemia and Infraction - briefly Derangements of body fluids Disorders of circulation Anaemia, Leukaemia.

GFC-105 Pathology Practical

Demonstration in the lab of the following procedure-

- Bleeding time
- Clotting time
- Typhoid test
- Blood group test
- CBC test

Recommended Books:

1. Textbook of Pathology by Dr.Harshmohan.
2. Robbin's Pathologic Basis of Disease.
3. Practical Pathology by Tejender Singh.
4. Medical Lab Techniques by Prof V.H.Talib.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: GFC-203 (Theory) GFC-206 (Practical)

Title of the Course: Microbiology

L-30, P-20 **Credits: (L=1,P=1, T=0) 2**

COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the basic purpose of microbiology.
CLO-2- The student will learn about the classifications of micro-organisms.
CLO-3-The student should be able to understand the microbial physiology and to identify the microorganisms.
CLO-4-The student will be able to remember the regulation of biochemical pathway and possible process modifications for improved control over micro-oraganism.

Mapping of Course Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	1	2	1	1	1	2	2	2	2	1	1	2	1	1
CLO2	2	2	1	1	1	3	1	1	1	1	1	2	1	1
CLO3	3	3	2	1	1	2	1	2	1	1	1	2	2	1
CLO4	2	3	1	1	1	1	1	1	1	1	1	1	1	1

GFC-203 Microbiology (Theory)

Unit 1- **5 hours**

Introduction to microbes, source of infection, models of spread, bacterial Cell, growth requirements of bacteria, bacteria Cycle.

Unit 2- **5 hours**

Sterilization and Disinfection; Definition; Methods of sterilization procedures techniques and uses; Clinical Importance, Biomedical Waste & Its management.

Unit 3- **10 hours**

HIV & AIDS, Hepatitis Virus; Hepatitis A; B; & C failures of various types of hepatitis virus Basic Fundamentals of Immunology Immunological Apparatus; structure and functions, T-Cells; B-Cell lymphocytes Antigen, Antibody, Antigen and Antibody reactions

Immunoglobulins; Classes of immunoglobulins; IgG; IgA; IgM; IgD; IgE; Immune Responses; Immunity; Hypersensitivity.

Unit 4- 10 hours

Classification of Human Parasites Vector and arthropods of medical importance (Mosquitoes, Fleas, Tick, Flies, Sand fly, Scabies etc)

GFC- 206 Microbiology (Practical)

Practical based on syllabus mentioned in theory subjects.

Recommended Books:

1. Ramanik Sood, Laboratory Technology (Methods and Interpretations) J.P. Bros, New Delhi.
2. Sachdev K N, Clinical Pathology & Bacteriology J.P. Bros, New Delhi.
3. Basic Laboratory Methods in Parasitology, J.P. Bros, New Delhi.
4. Ananthnarayan & Panikar, Textbook of Medical Microbiology.
5. Robert Cruckshank, Medical Microbiology – The practice of Medical Microbiology.
6. D.R. Arora Textbook of Microbiology, CBS Publications, New Delhi.
7. Prof. C.P. Baveja, Practical Microbiology, Arya Publications.
8. Arya Publications.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.

4. Total assessment is of 100 marks which is made by the sum up of IA+ EA

SEMESTER-III

Course Code: BDT-301 (Theory) BDT-304 (Practical)

Title of the Course: Applied Anatomy & Physiology of Kidney

L-50, P-20 **Credits: (L=2,P=1, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CO-1- The student will be able to know the anatomy and physiology of Kidney.
CO-2- The student will learn the mechanism of the development of kidney.
CO-3- The student will understand the different function of kidney like urine formation, regulation of body temperature, hormone production.
CO-4- The student will be able to remember the major function of kidney in the human body

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	2	2	1	2	3	1	3	1	1	1	2	1	2	1
CLO2	1	1	2	1	3	2	2	1	2	1	2	1	1	1
CLO3	2	1	1	2	1	2	1	2	1	1	1	2	1	1
CLO4	1	3	1	1	2	3	1	1	1	2	2	1	1	2

BDT-301 Applied Anatomy & Physiology of Kidney (Theory)

Unit 1- **15 hours**

Development of kidney in brief, basic anatomy of urinary system, histology of kidney, blood supply of kidney, anatomy of peritoneum including concept of abdominal hernias, anatomy of vascular system- upper limb vessels- course, distribution, branches, origin and abnormalities, neck vessels- course, distribution, branches, origin and abnormalities, femoral vessels- course, distribution, branches, origin, and abnormalities.

Unit 2- **20 hours**

Mechanism of urine formation, glomerular filtration rate. Clearance studies, physiological values- urea, creatinine, electrolytes, calcium, phosphorus, uric acid, magnesium, glucose, 24 hours urinary indices.

Physiology of Renal Circulation- Factors Contributing & Modifying Renal Circulation, Auto-regulation. Hormones Produced By Kidney & Physiologic Alterations In Pregnancy Haemostasis – Coagulation Cascade, Coagulation Factors, Auto Regulation, BT, CT, PT, PTT, Thrombin Time.

Unit 3- 15 hours

Acid base balance- basic principles & common abnormalities like hypokalaemia, hyponatremia, hyperkalaemia, hypernatremia, hypocalcaemia, hypercalcemia, pH etc.

BDT 304- Applied Anatomy & Physiology of Kidney (Practical)

Practical based on syllabus mentioned in theory subjects.

Recommended Books-

1. Textbook of Medical Physiology by K.Sembulingum.
2. The Kidney by Brenner and Rector Third Edition.
3. Renal System basic science and clinical conditions by Michael Field, Carol Pollock, David Harris. Second Edition.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT-302 (Theory) BDT-305 (Practical)

Title of the Course: Pharmacology related to hemodialysis and peritoneal dialysis

L-50, P-20 **Credits: (L=2,P=1, T=0) 3**

.COURSE LEARNING OUTCOMES (COs)

CLO-1- The studen will be able to know the general pharmacology in medicine.
CLO-2- The student will learn the concept of how drug deal with the body.
CLO-3- The student will understand the routes of drug administration, their uses and side effects.
CLO-4- The student will remember the indication and contraindication of each drug prescribed in hemodialysis and peritoneal dialysis patient.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	2	2	1	2	2	1	3	1	1	1	2	1	2	1
CLO2	3	1	1	1	2	1	2	1	2	1	2	1	1	2
CLO3	1	1	2	2	1	1	1	2	1	2	1	2	2	1
CLO4	2	2	1	1	2	1	1	1	2	2	2	1	1	2

BDT 302- Pharmacology Related to Hemodialysis and Peritoneal Dialysis (Theory)

Unit 1- **15 hours**

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.

Unit 2- **20 hours**

Drugs & dialysis – dose & duration of administration of drugs, dialysable drugs – phenobarbitone, lithium, methanol etc. Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value Erythropoietin in detail Heparin including low molecular weight heparin protamine sulphate Formalin, sodium hypochlorite, hydrogen peroxide – role as disinfectants & adverse effects of residual particles applicable to formalin.

Unit 3- **15 hours**

hemodialysis concentrates- composition and dilution (acetate and bicarbonates), peritoneal dialysis fluid in particular hypertonic solutions- composition, potassium exchange resins with special emphasis on mode of administration.

BDT 305- Pharmacology Related to Hemodialysis and Peritoneal Dialysis (Practical)
Practical based on syllabus mentioned in theory subjects.

Recommended Books-

1. Essentials of Medical Pharmacology by K.D.Tripathi. 8th Edition.
2. Basics and clinical pharmacology special India edition by Bertram G.Katzung. 15th Edition.
3. Pharmacology for Medical Graduates by Tara V.S and Smita Shenoy, 4th Edition.
4. Textbook of Pharmacology by Prasan R.Bhandari, 1st Edition.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT-303 (Theory) BDT-306 (Practical)

Title of the Course: Renal diseases & Management.

L-50, P-20 **Credits: (L=2,P=1, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the different types of kidney diseases.
CLO-2- The student will learn the pathophysiology of each diseases.
CLO-3- The student will be able to understand the clinical manifestation of each diseases.
CLO-4- The student will be able to remember the management and treatment of kidney diseases common in the general population.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**
CLO1	3	2	2	2	3	1	3	1	1	2	2	1	2	1
CLO2	1	2	2	1	3	2	1	1	2	1	2	1	1	1
CLO3	3	2	1	2	1	1	1	2	1	2	1	2	1	1
CLO4	2	3	2	1	2	3	1	2	1	2	2	1	1	2

BDT 303- Renal Diseases And Management (Theory)

Unit 1- **20 hours**

Acute kidney injury- Definition, Causes, Pathophysiology of AKI, Causes of AKI, Risk factors of AKI, Prerenal causes, Post renal causes, Renal causes of AKI, Signs and symptoms of AKI, RIFLE Criteria of AKI, Diagnosis of AKI, Initial management of AKI, Treatment of choice, dose and duration of Hemodialysis.

Chronic kidney disease- Definition by KDIGO, Classification of CKD on the basis of GFR and Albuminuria category, Causes of CKD, Risk factors of CKD, Pathophysiology of CKD, signs and symptoms, diagnosis on the basis of stages, treatment on the basis of stages.

nephrotic syndrome- primary and secondary, nephritic syndrome.

Unit 2- **20 hours**

Urinary tract infection- Definition, Risk factors, epidemiology, pathophysiology, types of UTI, causes, clinical manifestation, diagnosis, treatment of all types.

Renal stone diseases- Definition, risk factors, epidemiology, pathophysiology, types of kidney stones, causes of kidney stones, composition of stones, clinical manifestations, diagnosis, and treatment.

Obstructive uropathies.

Unit 3- **10 hours**

Congenital and inherited renal diseases, renal vascular disorders and hypertension associated renal diseases, tumours of kidney, asymptomatic urinary abnormalities, pregnancy associated renal diseases.

BDT 306- Renal Diseases And Management (Practical)

Practical based on syllabus mentioned in theory subjects.

Recommended Books-

1. ABC of Kidney Disease by David Goldmith, Satish Jayawardene and Penny Ackland, 2nd Edition.
2. Handbook of Chronic kidney disease management by John T.Daugaridas, 4th Edition.
3. Brenner and Rector The Kidney-Volume 1

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

SEMESTER-IV

Course Code: BDT-401 (Theory) BDT-404 (Practical)

Title of the Course: Basics of Dialysis Technology

L-40, P-20 **Credits: (L=2,P=1, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the basic of dialysis therapy.
CLO-2- The student will learn the different form of dialysis perform in the kidney failure patient.
CLO-3- The student will understand on what principles does dialysis work.
CLO-4- The student will remember the dos and don't during the dialysis.
CLO-5- The student will be able to perform the basic procedure in the dialysis unit.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	2	1	2	2	1	3	1	2	1	2	1	2	1
CLO2	2	2	1	1	3	2	2	1	2	1	2	1	1	1
CLO3	2	1	2	2	2	2	1	2	1	1	1	2	1	1
CLO4	1	3	1	1	2	3	1	1	1	2	2	1	1	2

Detailed syllabus:

BDT 401- Basics of Dialysis Technology (Theory)

Unit 1- **20 hours**

Indications of Dialysis, types of dialysis, principles of dialysis- definition, hemodialysis apparatus- extracorporeal circuit, dialyzer, types of dialyzers and membrane.

Unit 2- **20 hours**

Vascular access, types of vascular access, introduction to hemodialysis machine, priming of dialysis apparatus, dialyzer reuse, common complications of hemodialysis, monitoring of patients during dialysis.

BDT 404- Basics of Dialysis Technology (Practical)

Clinical postings in dialysis unit and Practical based on syllabus mentioned in theory subjects.

Recommended Books-

1. Handbook of Dialysis Therapy- Allen.R.Nissenson & Richard N. Fine-4th edition- Saunders, Elsevier.
2. Handbook of Dialysis by John.T. Daugaridas.
3. Dialysis Therapy 3rd Edition- Nissenson Fine.
4. Review of Hemodialysis for Nurses and Dialysis Personnel- by Judith Z.Kallenbach.
5. Renal Nursing by Nicola Thomas.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT-402 (Theory)

Title of the Course: Nutrition

L-30, P-0 **Credits: (L=1,P=0, T=0) 1**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the basics of nutrients.
CLO-2- The student will learn about the different forms of nutrients, classification of nutrients.
CLO-3- The student will understand about the needs of nutrients.
CLO-4- The student will remember why kidney friendly diet is recommended in kidney disease patient.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	2	1	2	3	1	2	1	1	1	2	1	2	1
CLO2	1	2	2	1	3	1	2	1	2	1	2	1	1	1
CLO3	2	1	2	2	1	2	1	2	1	1	1	2	1	1
CLO4	1	3	1	1	2	2	1	1	1	2	2	1	1	2

Detailed syllabus:

BDT 402- Nutrition (Theory)

Unit 1- **10 hours**

Nutrition definition, food pattern and its relation to health, factors influencing food habits, selection and food stuffs, superstitions, culture, religion, income, composition of family, age, occupation, special group etc.

Unit 2- **10 hours**

Food selection, storage and preservation, prevention of blood adulteration, classification of nutrients, macronutrients, and micronutrients. Proteins- types, source, requirements, and deficiency. Fats- types, sources, requirements, and deficiency of fats. Water-sources of drinking water, requirements, preservation of water.

Unit 3- **10 hours**

Minerals- types, sources, requirements, deficiencies of minerals. Vitamins- types, sources, requirements deficiencies of vitamins.

Books References:

1. Handbook of Nutrition in Kidney Disease (Oxford Clinical Practice Book) by Anita Saxena
2. South Asian Edition of handbook of nutrition and the kidney 7th Edition by T Alp Ikizler William E Mitch.
3. Textbook of Dialysis Therapy by Dr Jigar Shrimali

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT- 403(Theory) 405 (Practical)

Title of the Course: Applied Dialysis Technology-I

L-30, P-1 **Credits: (L=1,P=1, T=0) 2**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the principles of dialysis.
CLO-2- The student will learn the different procedures of dialysis like priming of the dialysis circuit.
CLO-3- The student will understand the anatomy of vascular access.
CLO-4- The student will remember the steps of minor and major procedures done during and post dialysis.
CLO-5- The student will be able to perform the cannulation, termination and priming

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	2	2	1	1	1	3	1	1	1	1	1	2	1
CLO2	2	1	2	1	1	2	1	1	2	1	2	2	1	1
CLO3	2	2	2	2	3	2	1	2	1	1	1	2	1	1
CLO4	1	3	1	1	1	3	1	1	1	2	2	1	1	2

Detailed syllabus:

BDT 403- Applied Dialysis Technology-I (Theory)

Unit 1- **10 hours**

Indications of dialysis History & types of dialysis Theory of haemodialysis – diffusion, osmosis, ultrafiltration & solvent drug Haemodialysis apparatus – types of dialyzer & membrane, dialysate Physiology of peritoneal dialysis Vascular access for haemodialysis & associated complications Peritoneal access devices – types of catheters, insertion techniques & associated complications.

Unit 2- **10 hours**

Dialysis machines - mechanism of functioning & management _ haemodialysis machine, peritoneal dialysis machine Complications of dialysis Haemodialysis – acute & long-term complications.

Unit 3- **10 hours**

Peritoneal dialysis – mechanical & metabolic complications Biochemical investigations required for renal dialysis, Adequacy of dialysis, Peritoneal equilibration test (PET), Anti coagulation, Peritonitis & exit site infection, withdrawal of dialysis criteria Acute dialysis and Chronic dialysis.

BDT 405- Applied Dialysis Technology- I (Practical)

Clinical Postings in dialysis unit and Practical based on syllabus mentioned in theory subjects.

Books References-

1. Handbook of Dialysis Therapy- Allen.R.Nissenson & Richard N. Fine-4th edition- Saunders, Elsevier.
2. Handbook of Dialysis by John.T. Daugaridas.
3. Dialysis Therapy 3rd Edition- Nissenson Fine.
4. Review of Hemodialysis for Nurses and Dialysis Personnel- by Judith Z.Kallenbach.
5. Renal Nursing by Nicola Thomas.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

SEMESTER-V

Course Code: BDT-501(Theory) 504 (Practical)

Title of the Course: Applied Dialysis Technology-II

L-30, P-50 **Credits: (L=1,P=2, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the principles of dialysis.
CLO-2- The student will learn the different procedures of dialysis like priming of the dialysis circuit,termination of the dialysis, reprocessing of the dialyzer.
CLO-3- The student will understand the catheterization steps of different temporary access.
CLO-4- The student will remember the steps of minor and major procedures done during and post dialysis
CLO-5- The student will be able to perform the independent dialysis and manages the different complications during dialysis.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	3	1	2	3	1	3	1	1	1	2	1	2	1
CLO2	2	3	1	1	3	1	1	2	2	1	2	1	1	1
CLO3	2	1	2	2	1	1	1	2	1	1	1	2	1	1
CLO4	1	3	1	2	2	3	1	1	1	2	2	1	1	2

Detailed Syllabus:

BDT 501- Applied Dialysis Technology-II (Theory)

Unit 1- **10 hours**

Dialysis in special situations, Patients with congestive cardiac failure, Advanced liver disease, patients positive for HIV, HBSAg & HCV Failed transplant Poisoning cases Pregnancy Dialysis in infants & children.

Unit 2- **10 hours**

Dialyzer reuse, special dialysis procedures, continuous therapies in hemodialysis, different modalities of peritoneal dialysis, hemodiafiltration, hemoperfusion, SLED, MARS, plasmapheresis

Unit 3- **10 hours**

Special problems in dialysis patients- psychology and rehabilitation, diabetes, hypertension, infections, bone diseases, aluminium toxicity, water treatment system, renal anemia management and chronic dialysis.

BDT 504- Applied Dialysis Technology-II (Practical) **50 hours**

Setting up dialysis machine for dialysis, AV cannulation, AV fistula/a v graft cannulation, Initiation of dialysis through central venous catheters like Internal jugular, femoral & subclavian vein Packing & sterilization of dialysis trays. Closing of dialysis, Preparation of concentrates depending on the situations, Reuse of dialysis apparatus, Isolated ultrafiltration, Performance of peritoneal dialysis exchange manually, Setting up of automated peritoneal dialysis equipment . First assistant in minor procedures and skin suturing.

Books Recommended -

1. Handbook of Dialysis Therapy- Allen.R.Nissenson & Richard N. Fine-4th edition- Saunders, Elsevier.
2. Handbook of Dialysis by John.T. Daugaridas.
3. Dialysis Therapy 3rd Edition- Nissenson Fine.
4. Review of Hemodialysis for Nurses and Dialysis Personnel- by Judith Z.Kallenbach.
5. Renal Nursing by Nicola Thomas.
6. Primer on Kidney Disease by Arthur Greenberg.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT-502(Theory) 505 (Practical)

Title of the Course: Critical care Nephrology

L-30, P-50 **Credits: (L=1,P=2, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know the assessment of critical patient
CLO-2- The student will learn the different method of assessment of ill patient.
CLO-3- The student will understand the use of instruments requires for the assessment of sick patient.
CLO-4- The student will remember the steps of CPR, Defibrillation use and identification of sick patient.
CLO-5- The student will be able to perform CPR.

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	2	3	2	2	3	1	1	1	1	1	2	1	2	1
CLO2	2	2	1	1	1	1	1	2	2	1	2	1	1	1
CLO3	1	1	1	2	1	1	1	2	1	1	1	2	1	1
CLO4	1	3	1	2	2	3	1	1	1	2	2	1	1	2

Detailed syllabus:

BDT 502- Critical Care Nephrology (Theory)

Unit 1- **15 hours**

Assessment of Sick patient Definition of sick patient – Consciousness – Pulse – breathing – Blood pressure – Neurological function Management of Sick patient Sick patient treatment – teamwork – How to organize a team and be a member of a team Circulation – Blood Pressure – pulse – Respiration – respiration rate – consciousness –assessment – How to monitor sick patients. Oxygen – respiration – defibrillator – pulseoximeter. Intervention of Sick patient CPR Identify the parameters important in normal person - consciousness - Respiration rate –

Temperature – Pulse – Blood pressure – Auscultative for heart lung – Bladder – Paralysis pupils.

Unit 2- **10 hours**

Instruments useful to monitor – BP apply – thermometer – Pulse oximeter – ECG monitor-respirator monitor - IBP, NBP-monitor CPR (Cardiopulmonary Resuscitation) Airway – Breathing – Circulation – Defibrillation – Evaluating.

Unit 3- **05 hours**

Maintaining records – Inform to doctors – Following the orders Critical Care Nephrology – Management of Renal Failure in ICU Basic Principles of Blood Transfusion & Fluid Therapy.

BDT 505- Critical Care Nephrology (Practical) **50 hours**

Clinical Postings in Dialysis Unit and topics covered in theory.
Monitoring of dialysis patients- Maintain records of each patient.
Management of complications during dialysis.
Performing the pre dialysis assessment of dialysis patient.
Performing all the procedures in the dialysis unit.

Books References-

1. Handbook of Dialysis Therapy- Allen.R.Nissenson & Richard N. Fine-4th edition- Saunders, Elsevier.
2. Handbook of Dialysis by John.T. Daugaridas.
3. Dialysis Therapy 3rd Edition- Nissenson Fine.
4. Review of Hemodialysis for Nurses and Dialysis Personnel- by Judith Z.Kallenbach.
5. Renal Nursing by Nicola Thomas.
6. Primer on Kidney Disease by Arthur Greenberg.
7. Oxford handbook of dialysis-2nd Edition-Jeremy Levy, Julie Morgan, Edwin Brown.
8. Critical care nephrology-4th edition by Ronco, Bellomo, Kellum and Ricci.
9. Handbook of critical care nephrology 1st edition by Koyner.

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.

3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

Course Code: BDT-503(Theory) 506 (Practical)

Title of the Course: Recent Advances

L-30, P-50 **Credits: (L=1,P=2, T=0) 3**

.COURSE LEARNING OUTCOMES (CLOs)

CLO-1- The student will be able to know Renal Transplantations and nocturnal dialysis and online dialysis.
CLO-2- The student will learn the donors and recipient role and type.
CLO-3- The student will understand the procedure of the renal transplantation councelling, test and evaluation done prior to the transplantation.
CLO-4- The student will remember the complications post transplantation.
CLO-5- The student will be able to perform the nocturnal dialysis

Mapping of Course Outcomes (COs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	3	1	2	3	1	3	1	1	1	2	1	2	1
CLO2	2	3	1	1	3	1	1	2	2	1	2	1	1	1
CLO3	2	1	2	2	1	1	1	2	1	1	1	2	1	1
CLO4	1	3	1	2	2	3	1	1	1	2	2	1	1	2

Detailed syllabus:

BDT 503- Recent Advances (Theory)

Unit 1- **20 hours**

Renal Transplantation, indications and contraindications, immunology related to transplants, donor selection, evaluation of donor and recipient, test related to donor and recipients, surgical procedure, complications post-transplant, post-transplant care.

Unit 2- **10 hours**

Recent advances in hemodialysis, nocturnal dialysis, online dialysis, telemedicine in dialysis practice.

BDT 506- Recent Advances (Practical) **50 hours**

Clinical Postings in Dialysis Unit. Practical based on syllabus mentioned in theory subjects.

Recommended Books-

1. Handbook of Dialysis Therapy- Allen.R.Nissenson & Richard N. Fine-4th edition- Saunders, Elsevier.
2. Handbook of Dialysis by John.T. Daugaridas.
3. Dialysis Therapy 3rd Edition- Nissenson Fine.
4. Handbook of Kidney Transplantation-6th Edition by Danovitch, Gabriel M.
5. Handbook of Organ Transplantation by Jayshri. A.S ,Sujata.P

Teaching-Learning Strategies-

1. Student centric discussion is a teaching strategy that allows students to understand more topics or concepts via collaboration.
2. Collaborative learning is a teaching strategy that focuses on encouraging teamwork and partnership.
3. Visual, Auditory and Kinaesthetic it is a very comprehensive teaching strategy that focuses on improved learning experiences using three main sensory receivers.
4. Spaced learning is a teaching strategy that makes practising a skill or retrieving information efficient for students.

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.

SEMESTER-VI

BDT 601

Project work and viva-voce

Teaching strategy in project work:

1. Weekly work report of the work done in the clinical area.
2. Updating student about the newly added topics.
3. Topic related information, resources need to be shared on every meeting.
4. To guide how to prepare the template of the project work.
5. Helping in analysing the result and interpretation**.**

Assessment methods and weightages-

1. Assessment is done on the basis of Internal Assessment and External Assessment.
2. IA is of 25 marks which is assessed on the sessional exam score of the student. It can be best of two sessional or average of two sessional.
3. External Assessment is of 75 marks which is assessed on the basis of semester examinations.
4. Total assessment is of 100 marks which is made by the sum up of IA+ EA.