



MGM SCHOOL OF BIOMEDICAL SCIENCES, NAVI MUMBAI

(A constituent unit of MGM INSTITUTE OF HEALTH SCIENCES)

(Deemed University u/s 3 of UGC Act 1956)

Grade "A" Accredited by NAAC

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**CHOICE BASED CREDIT SYSTEM
(CBCS)**

(With effect from 2018-19 Batches)

Curriculum for
B.Sc. Allied Health Sciences
B.Sc. Medical Dialysis Technology

As Amended in BOM-63/2021 [Resolution No.4.3.1.2.], Dated 17/02/2021
As Amended in BOM-63/2021 [Resolution No.4.3.1.3.], Dated 17/02/2021

Dr. Rajesh B. Goel
Registrar

MGM Institute of Health Sciences
(Deemed University u/s 3 of UGC Act 1956)
Navi Mumbai- 410 209

Amended History

Approved as per BOM -52/2018 [Resolution No.3.10.1.], Dated 13/01/2018
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As Amended in BOM -59/2019 [Resolution No.3.2.3.8.], Dated 11/11/2019

Dr. Rajesh H. Goud
Registrar
MCI Institute of Health Sciences
MCI Institute of Health Sciences
MCI Institute of Health Sciences

OUTLINE OF COURSE CURRICULUM												
B.Sc. Medical Dialysis Technology												
Semester I												
Code No.	Core Subjects	Credits/Week				Hrs/Semester				Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Total hrs.	Internal Assessment	Semester Exam	Total
Theory												
BMDT 101 L	Human Anatomy Part I	3	-	-	3	45	-	-	45	20	80	100
BMDT 102 L	Human Physiology Part I	3	-	-	3	45	-	-	45	20	80	100
BMDT 103 L	General Biochemistry Nutrition	3	1	-	4	45	15	-	60	20	80	100
BMDT 104 L	Introduction to National Health Care System (Multidisciplinary/ Interdisciplinary)	3	-	-	3	45	-	-	45	20	80	100
Practical												
BMDT 101 P	Human Anatomy Part I	-	-	4		-	-	60	60	-	-	-
BMDT 102 P	Human Physiology Part I	-	-	4		-	-	60	60	-	-	-
BMDT 103 P	General Biochemistry	-	-	4		-	-	60	60	-	-	-
BMDT 105 P	Community Orientation & Clinical Visit (Including related practicals to the Parent course)	-	-	8		-	-	120	120	-	-	-
Ability Enhancement Elective Course												
AEC 001 L	English & Communication Skills	3	-	-	3	45	-	-	45	100	-	100
AEC 002 L	Environmental Sciences											
Total		15	1	20	16	225	15	300	540	180	320	500

OUTLINE OF COURSE CURRICULUM												
B.Sc. Medical Dialysis Technology												
Semester II												
Code No.	Core Subjects	Credits/Week				Hrs/Semester				Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Total hrs.	Internal Assessment	Semester Exam	Total
Theory												
BMDT 106 L	Human Anatomy Part II	2	-	-	2	30	-	-	30	10	40	50
BMDT 107 L	Human Physiology Part II	2	-	-	2	30	-	-	30	10	40	50
BMDT 108 L	General Microbiology	3	-	-	3	45	-	-	45	20	80	100
BMDT 109 L	Basic Pathology & Hematology	3	1	-	4	45	15	-	60	20	80	100
BMDT 110 L	Introduction to Quality and Patient safety (Multidisciplinary/Interdisciplinary)	3	-	-	3	45	-	-	45	20	80	100
Practical												
BMDT 106 P	Human Anatomy Part II	-	-	4		-	-	60	60	-	-	-
BMDT 107 P	Human Physiology Part II	-	-	2		-	-	30	30	-	-	-
BMDT 108 P	General Microbiology	-	-	4		-	-	60	60	-	-	-
BMDT 109 P	Basic Pathology & Hematology	-	-	4		-	-	60	60	-	-	-
BMDT 111 P	Community Orientation & Clinical Visit (Including related practicals to the parent course)	-	-	8		-	-	120	120	-	-	-
Skill Enhancement Elective Course												
SEC 001 L	Medical Bioethics & IPR	3	-	-	3	45	-	-	45	100	-	100
SEC 002 L	Human Rights & Professional Values											
Total		16	1	22	17	240	15	330	585	180	320	500

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester III														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BMDT 112 L	Introduction To Dialysis	3	-	-	-	3	45	-	-	-	45	20	80	100
BMDT 113 L	Fundamentals of Dialysis	3	-	-	-	3	45	-	-	-	45	20	80	100
BMDT 114 L	Pharmacology in Dialysis	3	-	-	-	3	45	-	-	-	45	20	80	100
BMDT 115 CP	MDT Directed Clinical Education -I	-	-	-	24	8	-	-	-	360	360	50	-	50
Practical														
BMDT 112 P	Introduction To Dialysis	-	-	4	-	2	-	-	60	-	60	10	40	50
BMDT 113 P	Fundamentals of Dialysis	-	-	4	-	2	-	-	60	-	60	10	40	50
Generic Elective Course														
GEC 001 L	Pursuit of Inner Self Excellence (POIS)	3	-	-	-	3	45	-	-	-	45	100	-	100
GEC 002 L	Organisational Behaviour													
Total		12	0	8	24	24	180	0	120	360	660	230	320	550

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester IV														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BMDT 116 L	Concept of Renal Disease & Disorders	4	-	-	-	4	60	-	-	-	60	20	80	100
BMDT 117 L	Nutrition in Dialysis	3	-	-	-	3	45	-	-	-	45	20	80	100
BMDT 118 CP	MDT Directed Clinical Education -II	-	-	-	30	10	-	-	-	450	450	50	-	50
Practical														
BMDT 116 P	Concept of Renal Disease & Disorders	-	-	2	-	1	-	-	30	-	30	10	40	50
BMDT 119	Seminar	-	-	-	-	1	-	-	-	-	50	-	50	50
Ability Enhancement Elective Course														
AEC 003 L	Computer and Applications	3	-	-	-	3	45	-	-	-	45	100	-	100
AEC 004 L	Biostatistics and Research Methodology													
Total		10	0	2	30	22	150	0	30	450	630	250	200	450

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester V														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BMDT 120 L	Applied Dialysis Technology: Part – I	4	-	-	-	4	60	-	-	-	60	20	80	100
BMDT 121 L	Advance Dialysis Technology Part –1	4	-	-	-	4	60	-	-	-	60	20	80	100
BMDT 122 CP	MDT Directed Clinical Education-III	-	-	-	24	8	-	-	-	360	360	50	-	50
Practical														
BMDT 120 P	Applied Dialysis Technology: Part – 1	-	-	4	-	2	-	-	60	-	60	10	40	50
BDT 121 P	Advance Dialysis Technology Part –1	-	-	4	-	2	-	-	60	-	60	10	40	50
Core Elective Course														
CEC 005 L	Basics of Clinical Skill Learning	3	-	-	-	3	45	-	-	-	45	100	-	100
CEC 006 L	Hospital Operation Management													
Total		11	0	8	24	23	165	0	120	360	645	210	240	450

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester VI														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
Theory														
BMDT 123 L	Applied Dialysis Technology - II	4	-	-	-	4	60	-	-	-	60	20	80	100
BMDT 124 L	Advance Dialysis Technology- II	4	-	-	-	4	60	-	-	-	60	20	80	100
BMDT 125 CP	MDT Directed Clinical Education -IV	-	-	-	30	10	-	-	-	450	450	50	-	50
Practical														
BDT 123 P	Applied Dialysis Technology - II	-	-	4	-	2	-	-	60	-	60	10	40	50
BDT 124 P	Advance Dialysis Technology - II	-	-	4	-	2	-	-	60	-	60	10	40	50
Total		8	0	8	30	22	120	0	120	450	690	110	240	350

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester VII & Semester VIII														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation	Total hrs.	Internal Assessment	Semester Exam	Total
	Sem VII (Internship)	-	-	-	720	16	-	-	-	720	720		-	-
	Sem VIII (Internship)				720	16				720	720			
Total		0	0	0	1440	32	0	0	0	1440	1440	0	0	0

B.Sc. Allied Health Sciences

DIRECTOR'S DESK

In 2007 the school of Biomedical Sciences was established with a mission of building up well qualified Allied Health Care professionals. The faculty set out to design an ideal biomedical graduate program which met the demands and expectations of the education system of our country. The college has been amending its perspective plan, which means extensive preparations for taking over the construction of the academic system including designing of courses, adopting the semester system over the existing pattern of annual system, continuous internal assessment and active industrial visits/Hospital Visits as the part of curriculum and implementing Credit base choice system to all the courses offered.

The School offers 7 UG Courses viz; B.Sc. Operation Theatre and Anesthesia technology, Dialysis Technology, Medical Radiology & Imaging Technology, Medical Laboratory Technology, Perfusion Technology, Cardiac Care Technology and Optometry.

The college adopts the national qualification frame work for the degree programs in terms of duration and levels of studies. The curricula is updated to make our education comparable to and compatible and in accordance with those of others and also to facilitate the mobility of our graduates for further studies and for employment both within and outside the country. The programs designed are the perfect embodiment of the vision, mission and core values of the college and are designed in such a way that students are commensurate to face the global employment opportunities.

ABOUT MGM SCHOOL OF BIOMEDICAL SCIENCES

Mission

To improve the quality of life, both at individual and community levels by imparting quality medical education to tomorrow's doctors and medical scientists and by advancing knowledge in all fields of health sciences through meaningful and ethical research.

Vision

By the year 2020, MGM Institute of Health Sciences aims to be top-ranking Centre of Excellence in Medical Education and Research. Students graduating from the Institute will have the required skills to deliver quality health care to all sections of the society with compassion and benevolence, without prejudice or discrimination, at an affordable cost. As a research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain the highest ethical standards.

About – School of Biomedical Sciences

MGM School of Biomedical Sciences is formed under the aegis of MGM IHS with the vision of offering basic Allied Science and Medical courses for students who aspire to pursue their career in the Allied Health Sciences, teaching as well as research.

School of Biomedical Sciences is dedicated to the providing the highest quality education in basic medical sciences by offering a dynamic study environment with well equipped labs. The school encompasses 21 courses each with its own distinct, specialized body of knowledge and skill. This includes 7 UG courses and 14 PG courses. The college at its growing years started with mere 100 students has recorded exponential growth and is now a full-fledged educational and research institution with the student strength reaching approximately 581 at present.

Our consistent theme throughout is to encourage students to become engaged, be active learners and to promote medical research so that ultimately they acquire knowledge, skills, and understanding so as to provide well qualified and trained professionals in Allied Health Sciences to improve the quality of life.

As there is increased need to deliver high quality, timely and easily accessible patient care system the collaborative efforts among physicians, nurses and allied health providers become ever more essential for an effective patient care. Thus the role of allied health professionals in ever-evolving medical system is very important in providing high-quality patient care.

Last but by no means least, School of Biomedical Sciences envisions to continuously grow and reform. Reforms are essential to any growing institution as it fulfills our bold aspirations of providing the best for the students, for us to serve long into the future and to get ourselves updated to changing and evolving trends in the health care systems.

Name of the Degree: B.Sc. Medical Dialysis Technology

Duration of Study:

The duration of the study for B.Sc. Medical Dialysis Technology will be of 4 years (3 years Academics +1 year Internship).

Program pattern:

- First Semester: July
- Second Semester: January
- Third Semester: July
- Fourth Semester: January
- Fifth Semester-July
- Sixth Semester-January

Eligibility Criteria:

- He/she has passed the Higher Secondary (10+2) with Science (PCB) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, and Biology.
- Minimum percentage of marks: 45% aggregate.

Medium of Instruction:

English shall be the Medium of Instruction for all the Subjects of study and for examinations.

For any query visit the website: www.mgmsbsnm.edu.in

Preamble

India is one of the rising countries in providing medical and para medical facilities for the patients. There are all most more than 200 medical colleges and equivalent paramedical institutions which have potential to provide skill training to millions of youth through their own facilities and/or by establishing extension centres in collaboration with government medical colleges (AIIMS, NIMHANS etc.) and Research Centres (ICMR, DBT, BARC, NIRRH, etc.) or Vocational Skill Knowledge providers, NGOs. The high quality of medical care we enjoy today is built upon years of effort by Physicians, Nurses, Physiotherapist, Research Scholars and other medical professionals investigating the causes of and potential treatments for disease. The tireless effort of countless medical professionals has made many life-threatening diseases and conditions a faded memory.

India faces an acute shortage of over 64 lakh skilled human resource in the health sector. Although occupational classifications vary across the globe, little has been done in India to estimate the need and to measure the competency of health care providers beyond the doctors and nurses. As Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India.

Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'

This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathways of allied and healthcare professionals, with a structured curriculum based on skills and competencies which is competence enough to face the challenges. The curriculum represents a conscious and systematic selection of knowledge, skills and values: a selection that shapes the way teaching, learning and assessment processes are organized.

MGM School Of Bio-Medical Sciences (Declared Under Section 3 Of The UGC Act, 1956) Accredited By NAAC with “A” Grade, Kamothe, Navi Mumbai, MGM University Regulations on “Choice Based Credit System - 2017”

Our MGMSBS institute is established with the goal to achieve the same and to initiate the patient’s care at the hospital for a high level of health and medical services, which are unusually complex, scientifically advanced, and costly in nature, to meet his special needs. Allied health professionals are very crucial part of evolving health care system as they support diagnosis, recovery, and quality of life. The scope of allied health professionals is profound as they provide direct patient care in virtually at every step. They provide critical care support in intensive care units, deliver scientific support in clinical laboratories, offer numerous rehabilitation services, manage and provide data critical to seamless patient care and diagnosis, operate sophisticated diagnostic equipment and contribute to broader public health outcomes.

In addition, the practice of the faculty is important to the community as teaching students are in the forefront of the knowledge of medical sciences and at MGMSBS.

MGMSBS is at par with any other MCI recognized medical colleges with the following available resources:

- Well equipped with physical facilities such as spacious and well furnished class rooms ,laboratories ,Skill centres ,Library and Hostels for enriching knowledge and to serve rural community and slums dwellers through this knowledge.
- We have qualified and trained faculty who can foster research in different discipline and well versed to scientifically formulate, implement and monitor community oriented programs and projects especially where the level of involvement in adoption of innovative and appropriate technologies involved.

Students of MGMSBS will be of tremendous help in making meaningful contribution to community and rural development. The involvement of allied health in implementing the Scheme of Community Development through Paramedics is need of the time.

The Chairman, University Grants Commission (UGC) has in his letter D.O.No.F.1- 1/2015 (CM) dated 8th January, 2015 has communicated the decision of the Ministry of Human Resources Development to

implement Choice Based Credit System (CBCS) from the academic session 2015-2016 in all Indian Universities to enhance academic standards and quality in higher education through innovation and improvements in curriculum, teaching learning process, examination and evaluation systems. UGC, subsequently, in its notification No.F.1-1/2015 (Sec.) dated 10/4/15 has provided a set of, Model curricula and syllabi for CBCS programmes under the Faculties of Arts, Humanities and Sciences providing the academic flexibility for Universities.

MGMSBS has taken the proactive lead in bringing about the academic reform of introducing CBCS for semester wise pattern for the B.Sc. Allied Health Science courses and M. Sc. Courses

CBCS – Definition and benefits: Choice Based Credit System is a flexible system of learning. The distinguishing features of CBCS are the following:

- It permits students to learn at their own pace.
- The electives are selected from a wide range of elective courses offered by the other University Departments.
- Undergo additional courses and acquire more than the required number of credits.
- Adopt an inter-disciplinary and intra-disciplinary approach in learning.
- Make best use of the available expertise of the faculty across the departments or disciplines
- Has an inbuilt evaluation system to assess the analytical and creativity skills of students in addition to the conventional domain knowledge assessment pattern.

Definitions of Key Words:

- i. **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.Choice Based Credit System (CBCS).
- ii. The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).
- iii. **Course:** Usually referred to, as “papers” is a component of a programme. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/ laboratory work/ outreach activities/

- project work/ viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.
- iv. **Credit Based Semester System (CBSS):** Under the CBSS, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students.
 - v. **Credit:** A unit by which the course work is interpreted. It functions the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.
 - vi. **Cumulative Grade Point Average (CGPA):** It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the sum total of the credit points obtained by the student in various courses in all semesters and the sum of the total credits of all courses in all the semesters.
 - vii. **Grade Point:** It is a numerical marking allotted to each letter grade on a 10-point scale.
 - viii. **Letter Grade:** It is an appreciated point of the student's performance in a selected course. Grades are denoted by letters O, A+, A, B, C and RA x. Programme: An educational programme leading to award of a Degree certificate.
 - ix. **Semester Grade Point Average (SGPA):** It is index of performance of all performance of work in a semester. Its total credit points obtained by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
 - x. **Semester:** Each semester will consist of minimum of 180 working days. The odd semester may be scheduled from June/ July to December and even semester from December/ January to June.

Semester System and Choice Based Credit System:

The semester system initiates the teaching-learning process and screws longitudinal and latitudinal mobility of students in learning. The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a sun shone" type approach in which the students can take choice of courses, learn and adopt an interdisciplinary approach of learning.

Semesters:**An academic year consists of two semesters:**

	UG	PG
Odd Semester 1 st semester	July – December	July – December
Odd Semester 3 rd , 5 th semesters	June – October/ November	
Even Semester 2 nd , 4 th , 6 th semesters	December – April	December - June

Credits:

Credit defines the coefficient of contents/syllabus prescribed for a course and determines the number of hours of instruction required per week. Thus, normally in each of the courses, credits will be assigned on the basis of the number of lectures/ tutorial laboratory work and other forms of learning required, to complete the course contents in a 15-20 week schedule:

- a. **1 credit** = 1 hour of lecture per week
- b. **3 credits** = 3 hours of instruction per week
 - ✓ Credits will be assigned on the basis of the lectures (L) / tutorials (T) / Clinical Training (CR) / laboratory work (P) / Research Project (RP) and other forms of learning in a 15-20 week schedule
 - L - One credit for one hour lecture per week
- c. **P/T** - One credit for every two hours of laboratory or practical
- d. **CR** - One credit for every three hours of Clinical training/Clinical rotation/posting
- e. **RP** - One credit for every two hours of Research Project per week – Max Credit 20- 25

	Lecture - L	Tutorial - T	Practical - P	Clinical Training/ Rotation– CT/CR	Research Project– RP*
1 Credit	1 Hour	2 Hours	2 Hours	3 Hours	2 Hours

RP*	Maximum Credit 20 – 25 / Semester				

Types of Courses: Courses in a programme may be of three kinds:

- **Core Course**
- **Elective Course**

Core Course: A course, which should compulsorily be studied by a candidate as a basic requirement is termed as a Core course. There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a basic requirement to complete programme of respective study.

Elective Course: A course which can be chosen from a very specific or advanced the subject of study or which provides an extended scope or which enables an exposure to some other domain or expertise the candidates ability is called an Elective Course.

Discipline Specific Elective (DSE) Course: Elective courses offered by the main subject of study are referred to as Discipline Specific Elective. The University / Institute may also offer discipline related Elective courses of interdisciplinary nature. An elective may be “Discipline Specific Electives (DSE)” gazing on those courses which add intellectual efficiency to the students.

Dissertation / Project: An Elective/Core course designed to acquire special / advanced knowledge, such as supplement study / support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher / faculty member is called dissertation / project.

Generic Elective (GE) Course: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline / subject may be treated as an elective by other discipline / subject and vice versa and such electives may also be referred to as Generic Elective.

Assigning Credit Hours per Course: While there is flexibility for the departments in allocation of credits to various courses offered, the general formula would be:

All core course should be restricted to a maximum of 4 credits.

- All electives should be restricted to a maximum of 3 credits.
- All ability enhancement course should be restricted to a maximum of 2 credits.
- Projects should be restricted to a maximum of 20-25 credits.

Programme Outcome:

After completing this programme, learner will be able to:

- Demonstrate pre- dialysis patient assessment and understand the knowledge about renal failure (ARF & CRF) and its management.
- To practice independently on dialyzer extracorporeal blood circuit priming and setting up the machine for dialysis procedure.
- To manifest aseptic cannulation of AVF/AVG and initiation of aseptic acute vascular access catheter care and dialysis initiation as well as machine disinfection methods.
- To upgrade knowledge on alarm processing, continuous monitoring of patient and machine during procedure.
- Demonstrate aseptic decannulation and catheter care after termination of dialysis along with operate and maintain R.O Water treatment plant.
- To work with polite attitude and strategic communication skills, grooming skills, professional etiquettes and leadership qualities.

Programme Specific Outcome:

- The course will transpire the students into dialysis technologist, instrumentalist, academic researchers and renal care takers. Which could bring revolutionary dialysis specialists.

FIRST YEAR**B.Sc. Medical Dialysis Technology****SEMESTER-I**

Code No.	Core Subjects
Theory	
BMDT 101 L	Human Anatomy Part I
BMDT 102 L	Human Physiology Part I
BMDT 103 L	General Biochemistry & Nutrition
BMDT 104 L	Introduction to National Health Care System (Multidisciplinary/ Interdisciplinary)
Practical	
BMDT 101 P	Human Anatomy Part I
BMDT 102 P	Human Physiology Part I
BMDT 103 P	General Biochemistry
BMDT 105 P	Community Orientation & Clinical Visit (Including related practical to the parent course)
Ability Enhancement Elective Course	
AEC 001 L	English & Communication Skills
AEC 002 L	Environmental Sciences

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Human Anatomy- Part I
Course Code	BMDT 101 L

Teaching Objective	<ul style="list-style-type: none"> To introduce the students to the concepts related to General anatomy, Muscular, Respiratory, Circulatory, Digestive and Excretory system
Learning Outcomes	<ul style="list-style-type: none"> Comprehend the normal disposition, interrelationships, gross, functional and applied anatomy of various structures in the human body. Demonstrate and understand the basic anatomy of Respiratory and Circulatory system Demonstrate and understand the basic anatomy of Digestive and Excretory system

Sr.No.	Topics	No. of Hrs.
1	Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin	5
2	Skeletal System - Classification of bones, Parts of developing long bone and its blood supply, Joints I- Classification of joints, Joints II- Synovial Joint, Appendicular skeleton I- Bones of upper Limb, Appendicular skeleton II- Bones of lower limb, Axial skeleton-I , Axial skeleton-II	8
3	Muscular System - Muscle I-Types, Muscle II- Muscle groups and movements, Muscles of Upper limb, Muscles of lower limb, Muscles of Neck, Muscles of back , Muscles of abdomen	7
4	Joints – Shoulder, Hip, Knee, Movements and muscle groups producing movements at other joints	4
5	Respiratory System - Introduction to Respiratory system, Larynx, Thoracic cage and diaphragm, Lung & Pleura , Trachea & Bronchopulmonary segments , Mediastinum	6
6	Circulatory System - Types of blood vessels, Heart& Pericardium, Coronary Circulation, Overview of mediastinum , Blood vessels of Thorax	5
7	Digestive System - GIT I- Pharynx, Esophagus, GIT II-Stomach, GIT III- Small and Large Intestine, GIT IV-Liver & Gall Bladder, GIT V- Spleen, GIT VI-Pancreas , Salivary glands	7
8	Excretory System - Kidney, Ureter, Bladder, Urethra, Pelvis dynamic	3
Total		45hrs

BMDT 101 P - Human Anatomy Part I- (Demonstration)

Sr.No.	Topics	No of Hrs
1	Introduction to Anatomy, Terminology, Cell and Cell division, Tissues of body, Skin	60
2	Skeletal System - Classification of bones, Parts of developing long bone and its blood supply, Joints I- Classification of joints, Joints II- Synovial Joint, Appendicular skeleton I- Bones of upper Limb, Appendicular skeleton II- Bones of lower limb, Axial skeleton-I , Axial skeleton-II	
3	Muscular System - Muscle I-Types, Muscle II- Muscle groups and movements, Muscles of Upper limb, Muscles of lower limb, Muscles of Neck, Muscles of back , Muscles of abdomen	
4	Joints – Shoulder, Hip ,Knee , Movements and muscle groups producing , movements at other joints	
5	Respiratory System - Introduction to Respiratory system, Larynx, Thoracic cage and diaphragm, Lung & Pleura , Trachea & Bronchopulmonary segments , Mediastinum	
6	Circulatory System - Types of blood vessels, Heart& Pericardium, Coronary Circulation, Overview of mediastinum , Blood vessels of Thorax	
7	Digestive System - GIT I- Pharynx, Oesophagus, GIT II-Stomach, GIT III- Small and Large Intestine, GIT IV-Liver & Gall Bladder, GIT V- Spleen, GIT VI-Pancreas , Salivary glands	
8	Excretory System - Kidney, Ureter, Bladder, Urethra, Pelvis dynamic	
Total		60 hrs

TextBooks :

1. Manipal Manual of Anatomy for Allied Health Sciences courses: Madhyastha S.
2. G.J. Tortora & N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

Reference books:

1. B.D. Chaurasia : Volume I-Upper limb & Thorax,
Volume II- Lower limb, Abdomen & Pelvis
Volume III- Head, Neck, Face
Volume IV- Brain-Neuroanatomy
2. Vishram Singh: Textbook of Anatomy Upper limb & Thorax
Textbook of Anatomy Abdomen & Lower limb
Textbook of Head neck and Brain
3. Peter L. Williams And Roger Warwick:- Gray's Anatomy - Descriptive and Applied,
36th Ed; Churchill Livingstone.
4. T.S. Ranganathan : Text book of Human Anatomy
5. Inderbirsingh, G P Pal : Human Embryology
6. Textbook of Histology, A practical guide:- J.P Gunasegaran

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Human Physiology Part I
Course Code	BMDT 102 L

Teaching objective	<ul style="list-style-type: none"> To teach basic physiological concepts related to General physiology, Haematology, Nerve-Muscle physiology, Cardiovascular ,Digestive & Respiratory physiology
Learning outcomes	<ul style="list-style-type: none"> To understand the basic physiological concepts of General physiology To understand the basic physiological concepts of Hematology To understand the basic physiological concepts of Nerve-Muscle physiology To understand the basic physiological concepts of Respiratory physiology To understand the basic physiological concepts of Cardiovascular physiology

Sr.No.	Topics	No. of Hrs.
1	General Physiology- Introduction to physiology, Homeostasis, Transport Across cell membrane	3
2	Blood - Composition, properties and functions of Blood, Hemopoiesis , Hemogram (RBC, WBC, Platelet count, Hb Concentrations), Blood Groups - ABO and RH grouping, Coagulations & Anticoagulants, Anemias: Causes, effects & treatment, Body Fluid: Compartments, Composition, Immunity – Lymphoid tissue	10
3	Cardio vascular system - Introduction, general organization, functions & importance of CVS , Structure of heart, properties of cardiac muscle, Junctional tissues of heart & their functions, Origin & spread of Cardiac Impulse, cardiac pacemaker, Cardiac cycle & E C G, Heart Rate & its regulation, Cardiac output, Blood Pressure definition & normal values, Physiological needs & variation, regulation of BP	10
4	Digestive system - General Introduction, organization, innervations & blood supply of Digestive system, Composition and functions of all Digestive juices, Movements of Digestive System (Intestine), Digestion & Absorption of Carbohydrate, Proteins & Fats	6
5	Respiratory System -Physiologic anatomy, functions of respiratory system, non respiratory functions of lung, Mechanism of respiration, Lung Volumes & capacities, Transport of Respiratory GasesO ₂ , Transport of Respiratory Gases CO ₂ , Regulation of Respiration.	10
6	Muscle nerve physiology - Structure of neuron & types, Structure of skeletal Muscle, sarcomere, Neuromuscular junction& Transmission. Excitation & contraction coupling (Mechanism of muscle contraction)	6
Total		45 hrs

BMDT 102 P - Human Physiology Part I (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Study of Microscope and its use, Collection of Blood and study of Haemocytometer	60
2	Haemoglobinometry	
3	White Blood Cell count	
4	Red Blood Cell count	
5	Determination of Blood Groups	
6	Leishman's staining and Differential WBC Count	
7	Determination of Bleeding Time, Determination of Clotting Time	
8	Pulse & Blood Pressure Recording, Auscultation for Heart Sounds	
9	Artificial Respiration –Demonstration, Spirometry-Demonstration	
Total		60hrs

Textbooks

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of human Physiology for dental students-Indukhurana 2nd edition.
5. Essentials of medical Physiology for dental students –Sembulingum.

Reference books

1. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	General Biochemistry & Nutrition
Course Code	BMDT 103 L

Teaching Objective	<p>At the end of the course, the student demonstrates his knowledge and understanding on:</p> <ul style="list-style-type: none"> • Structure, function and interrelationship of biomolecules and consequences of deviation from normal. • Integration of the various aspects of metabolism, and their regulatory pathways. • Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data. • to diagnose various nutritional deficiencies • Identify condition and plan for diet • Provide health education base on the client deficiencies
Learning Outcomes	<ul style="list-style-type: none"> • Define “biochemistry.” • Identify the five classes of polymeric biomolecules and their monomeric building blocks. • Explain the specificity of enzymes (biochemical catalysts), and the chemistry involved in enzyme action. • Explain how the metabolism of glucose leads ultimately to the generation of large quantities of ATP. • Describe how fats and amino acids are metabolized, and explain how they can be used for fuel. • Describe the structure of DNA, and explain how it carries genetic information in its base sequence. • Describe DNA replication. • Describe RNA and protein synthesis. • Explain how protein synthesis can be controlled at the level of transcription and translation. • Summarize what is currently known about the biochemical basis of cancer.

Sr. No.	Topics	No. of Hrs.
1	Introduction and scope of biochemistry	1
2	Chemistry of carbohydrates, proteins, lipids and nucleic acid – Chemistry of Carbohydrates: Definition, Functions, Properties, Outline of classification with eg.(Definition of Monosaccharides, Disaccharides, Polysaccharides and their examples). Chemistry of Proteins: Amino acids (total number of amino acids, essential and non essential amino acids) .Definition, Classification of Proteins Structural organization of protein, Denaturation of Proteins. Chemistry of Lipids: Definition, functions, Classification (Simple Lipids, Compound Lipids, Derived Lipids.) Essential Fatty Acids. Chemistry of Nucleic acid: Nucleosides and Nucleotides, Watson and Crick model of DNA, RNA- it's type along with functions	12
3	Elementary knowledge of enzymes - Classification, mechanism of enzyme action, Factors affecting activity of enzymes, enzyme specificity, Enzyme inhibition, Isoenzymes and their diagnostic importance.	8
4	Biological oxidation - Brief concept of biological oxidation: Definition of Oxidative phosphorylation Electron transport chain. Inhibitors and Uncouplers briefly	5
5	Metabolism of Carbohydrate: Glycolysis, TCA cycle, Definition and significance of glycogenesis and glycogenolysis. Definition and significance of HMP shunt, definition and significance of gluconeogenesis. Regulation of blood Glucose level, Diabetes Mellitus, Glycosuria.Glucose Tolerance Test. Metabolism of Proteins: Transamination, Transmethylation reactions. Urea cycle, Functions of glycine, tyrosine, phenylalanine, tryptophan and Sulphur containing aminoacids. Metabolism of Lipid: Outline of beta oxidation with energetic, Ketone bodies (Enumerate) and its importance. Functions of cholesterol and its biomedical significance. Lipid profile and its diagnostic importance. Fatty liver, lipotropic factor, atherosclerosis. Metabolism of Nucleic acid: Purine catabolism (Formation of uric acid), Gout	14
6	Vitamins and Minerals- RDA, Sources, functions and deficiency manifestations of Fat soluble vitamins. RDA, sources, functions and deficiency manifestations of Water soluble vitamins. RDA, Sources, functions and deficiency manifestations of Calcium, Phosphorous, Iron, Iodine	5
7	Principle and applications of : Colorimeters, pH Meter	5
8	Pre examination Skills - Collection and preservation of samples (Anticoagulants), transportation & separation of biological specimens, Sample rejection criteria, Disposal of biological Waste materials.	5
9	Nutrition: History of Nutrition, Nutrition as a science, Food groups, RDA, Balanced diet, diet planning, Assessment of nutritional status, Energy: Units of energy, Measurements of energy and value of food, Energy expenditure, Total energy/calorie requirement for different age groups and diseases, Satiety value, Energy imbalance- obesity, starvation, Limitations of the daily food guide, Role of essential nutrients in the balanced diet	5
Total		60hrs

BMDT 103 P – General Biochemistry (Demonstration)

Sr. No.	Topics	No. of Hrs
1	Introduction to Personnel protective equipments used in laboratory and their importance (LCD)	60
2	Handling of colorimeters – operation and maintenance (LCD)	
3	Serum electrolytes measurement (only demo)	
4	Demonstration of semi automated / fully automated blood analyser	
5	Demonstration of tests for carbohydrates (Monosacchrides, disaccharides and polysaccharides)	
6	Precipitation Reactions of protein (only demonstration)	
7	Test on bile salts (only demonstration)	
8	Tests on Normal constituents of Urin (only demo)	
9	Tests on Abnormal constituents of Urin (only demo)	
Total		60 hrs

Textbooks:

1. Textbook of Medical Laboratory Technology, Volume 1, 3rd Edition by PrafulGhodkar
2. Textbook of Medical Laboratory Technology, Volume 2, 3rd Edition by PrafulGhodkar
3. Medical Laboratory Technology (Volume 1): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
4. Medical Laboratory Technology (Volume 2): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
5. Medical Laboratory Technology (Volume 3): Procedure Manual for Routine Diagnostic, Kanai Mukharjee
6. Essentials of Biochemistry, Second Edition, Dr.(Prof) Satyanarayana
7. Essentials of Biochemistry, 2nd Edition, Dr. PankajaNaik
8. Principles and Techniques of Biochemistry and Molecular Biology, 5th Edition, Wilson & Walker

Reference books:

1. An Introduction to Chemistry, 8th Edition by Mark Bishop
2. Clinical Chemistry made easy, 1st Edition by Hughes
3. Tietz Fundamentals of Clinical Chemistry , 7th Edition by Carl Burtis

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Introduction to National Health Care System (Multidisciplinary/Interdisciplinary)
Course Code	BMDT 104 L

Teaching Objective	<ul style="list-style-type: none"> To teach the measures of the health services and high-quality health care To understand whether the health care delivery system is providing high-quality health care and whether quality is changing over time. To provide to National Health Programme- Background objectives, action plan, targets, operations, in various National Health Programme. To introduce the AYUSH System of medicines.
Learning Outcomes	<ul style="list-style-type: none"> The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

Sr. No.	Topics	No. of Hrs.
1	Introduction to healthcare delivery system - Healthcare delivery system in India at primary, secondary and tertiary care; Community participation in healthcare delivery system; Health system in developed countries; Private / Govt Sector; National Health Mission; National Health Policy; Issues in Health Care Delivery System in India	10
2	National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.	8
3	Introduction to AYUSH system of medicine - Introduction to Ayurveda; Yoga and Naturopathy; Unani; Siddha; Homeopathy; Need for integration of various system of medicine	8
4	Health scenario of India- past, present and future	4
5	Demography & Vital Statistics- Demography – its concept; Census & its impact on health policy	5
6	Epidemiology - Principles of Epidemiology; Natural History of disease; Methods of Epidemiological studies; Epidemiology of communicable & non-communicable diseases, disease, transmission, host defense immunizing agents, cold chain, immunization, disease, monitoring and surveillance.	10
Total		45 hrs

Books:

1. National Health Programs Of India National Policies and Legislations Related to Health: 1 J. Kishore (Author)
2. A Dictionary of Public Health Paperback by J Kishor
3. Health System in India: Crisis & Alternatives , National Coordination Committee, Jan SwasthyaAbhiyan
4. In search In Search of the Perfect Health System
5. Central Bureau of Health Intelligence (1998). Health Information of India, Ministry of Health and Family Welfare, New Delhi.
6. Goyal R. C. (1993). Handbook of Hospital Personal Management, Prentice Hall of India, New Delhi, 17–41. Ministry of Health and Family Welfare (1984). National Health Policy, Annual Report (1983–4), Government of India, New Delhi
7. Historical Development of Health Care in India, Dr. Syed Amin Tabish,
8. cultural Competence in Health Care by Wen-Shing Tseng (Author), Jon Streltzer (Author)
9. Do We Care: India's Health System by K. Sujatha Rao (Author)

BMDT 105 P - Community Orientation & Clinical Visit (including related practical's to the parent course) (Total -120 hrs.)

ABILITY ENHANCEMENT ELECTIVE COURSE

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	English and Communication Skills
Course Code	AEC 001 L

Teaching Objective	<ul style="list-style-type: none"> This course deals with essential functional English aspects of the of communication skills essential for the health care professionals. To train the students in oral presentations, expository writing, logical organization and Structural support.
Learning Outcomes	<ul style="list-style-type: none"> Able to express better. Grow personally and professionally and Develop confidence in every field

Sr. No.	Topics	No. of Hrs.
1	Basics of Grammar - Vocabulary, Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words	6
2	Basics of Grammar – Part II - Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms	6
3	Writing Skills - Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension	3
4	Writing and Reading, Summary writing, Creative writing, news paper reading	3
5	Practical Exercise, Formal speech, Phonetics, semantics and pronunciation	5
6	Introduction to communication skills - Communication process, Elements of communication, Barriers of communication and how to overcome them, Nuances for communicating with patients and their attenders in hospitals	6
7	Speaking - Importance of speaking efficiently, Voice culture, Preparation of speech. Secrets of good delivery, Audience psychology, handling , Presentation skills, Individual feedback for each student, Conference/Interview technique	4
8	Listening - Importance of listening , Self assessment, Action plan execution, Barriers in listening, Good and persuasive listening	4
9	Reading - What is efficient and fast reading , Awareness of existing reading habits, Tested techniques for improving speed, Improving concentration and comprehension through systematic study	4
10	Non Verbal Communication - Basics of non-verbal communication, Rapport building skills using neuro- linguistic programming (NLP), Communication in Optometry practice	4
Total		45 hrs

Text books:

1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers. Cambridge University Press, New York, 1996.
2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Environmental Sciences
Course Code	AEC 002 L

Teaching Objective	<ul style="list-style-type: none"> To understand and define terminology commonly used in environmental science To teach students to list common and adverse human impacts on biotic communities, soil, water, and air Quality. To understand the processes that govern the interactions of organisms with the biotic and abiotic. Understand the relationship between people and the environment; Differentiate between key ecological terms and concepts
Learning Outcomes	<ul style="list-style-type: none"> Current environmental issues and highlight the importance of adopting an interdisciplinary approach. Sample an ecosystem to determine population density and distribution. Create food webs and analyse possible disruption of feeding relationships.

Sr. No.	Topics	No. of Hrs.
1	Components of Environment – Hydrosphere, lithosphere, atmosphere and biosphere – definitions with examples; Interaction of man and environment;	4
2	Ecosystem : Basic concepts, components of ecosystem, Tropic levels, food chains and food webs, Ecological pyramids, ecosystem functions, Energy flow in ecological systems, Characteristics of terrestrial fresh water and marine ecosystems,	5
3	Global Environmental Problems – Green House Effect, Acid rain, El Nino, Ozone depletion, deforestation, desertification, salination, biodiversity loss; chemical and radiation hazards.	4
4	Environmental pollution and degradation – Pollution of air, water and land with reference to their causes, nature of pollutions, impact and control strategies; perspectives of pollution in urban, industrial and rural areas. Habitat Pollution by Chlorinated Hydrocarbons (DDT, PCBs, Dioxin etc, Endocrine disrupting chemicals, Nutrient pollution.	8
5	Environmental Management – Concept of health and sanitation, environmental diseases – infectious (water and air borne) and pollution related, spread and control of these diseases, health hazards due to pesticide and metal pollution, waste treatment, solid waste management, environmental standards and quality monitoring.	6
6	Environmental Protection Act – Environmental Laws, national movements, environmental ethics – holistic approach of environmental protection and conservation, IUCN – role in environmental protection. Concept with reference to UN – declaration, aim and objectives of human right policies with reference to India, recent north-south debate on the priorities of implementation, Environmental Protection Agency (EPA)	10
7	Bioremediation – Oil spills, Wastewater treatment, chemical degradation, heavy Metals.	8
Total		45 hrs

Books:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Press

FIRST YEAR

B. Sc. Medical Dialysis Technology

SEMESTER- II

Code No.	Core Subjects
Theory	
BMDT 106 L	Human Anatomy Part II
BMDT 107 L	Human Physiology Part II
BMDT 108 L	General Microbiology
BMDT 109 L	Basic Pathology & Hematology
BMDT 110 L	Introduction to Quality and Patient safety
	(Multidisciplinary/Interdisciplinary)
Practical	
BMDT 106 P	Human Anatomy Part II
BMDT 107 P	Human Physiology Part II
BMDT 108 P	General Microbiology
BMDT 109 P	Basic Pathology & Hematology
BMDT 111 P	Community Orientation & Clinical Visit (Including related practical's to the parent course)
Skill Enhancement Elective Course	
SEC 001 L	Medical Bioethics & IPR
SEC 002 L	Human Rights & Professional Values

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Human Anatomy- Part II
Course Code	BMDT 106 L

Teaching Objective	<ul style="list-style-type: none"> To teach the students the basic anatomy of Reproductive , Lymphatic Endocrine ,Nervous system and Special senses
Learning Outcomes	<ul style="list-style-type: none"> Demonstrate and understand the basic anatomy of Reproductive and Lymphatic system. Demonstrate and understand the basic anatomy of Endocrine ,Nervous system Demonstrate and understand the basic anatomy of Special senses

Sr. No.	Topics	No. of Hrs.
1	Reproductive system - Male- Testis, Spermatic Cord, Female- Ovaries & Fallopian tube, Uterus	6
2	Lymphatic system - Lymphoid Organs, Lymph node groups- Cervical, Axillary, Inguinal	5
3	Endocrine system - Thyroid, Parathyroid, Adrenal, Pituitary	4
4	Nervous system - Introduction to nervous system(Neuron, ANS, PNS) Meninges, Cerebrum I, Cerebrum II, Cerebellum, Blood supply of Brain, Brain stem, Spinal cord, Cranial and peripheral nerves, CSF & Ventricles	12
5	Sensory system - Eye (Gross anatomy), Ear	3
Total		30hrs

BMDT 106 P - Human Anatomy Part II (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Reproductive system - Male- Testis, Spermatic Cord, Female- Ovaries & Fallopian tube, Uterus	60
2	Lymphatic system - Lymphoid Organs, Lymph node groups- Cervical, Axillary, Inguinal	
3	Endocrine system - Thyroid, Parathyroid, Adrenal, Pitutary	
4	Nervous system - Introduction to nervous system(Neuron, ANS, PNS) Meninges, Cerebrum I, Cerebrum II, Cerebellum, Blood supply of Brain ,Brain stem, Spinal cord, Cranial and peripheral nerves, CSF & Ventricles	
5	Sensory system - Eye (Gross anatomy), Ear	
Total		60 hrs

Textbooks:

1. Manipal Manual of Anatomy for Allied Health Sciences courses:Madhyastha S.
2. G.J. Tortora& N.P Anagnostakos: Principles of Anatomy and Physiology
3. B.D. Chaurasia: Handbook of General Anatomy

Reference books:

1. B.D. Chaurasia : Volume I-Upper limb & Thorax,
Volume II- Lower limb, Abdomen & Pelvis
Volume III- Head, Neck, Face
Volume IV- Brain-Neuroanatomy
2. Vishram Singh: Textbook of Anatomy Upper limb & Thorax
Textbook of Anatomy Abdomen & Lower limb
Textbook of Head neck and Brain
3. Peter L. Williams And Roger Warwick:- Gray's Anatomy - Descriptive and Applied,
36th Ed; Churchill Livingstone.
4. T.S. Ranganathan : Text book of Human Anatomy
5. Inderbirsingh, G P Pal : Human Embryology
6. Textbook of Histology, A practical guide:- J.P Gunasegaran

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Human Physiology Part II
Course Code	BMDT 107 L

Teaching Objective	<ul style="list-style-type: none"> To teach basic physiological concepts related to Renal physiology, Endocrinology & Reproductive physiology, CNS, Special senses
Learning Outcomes	<ul style="list-style-type: none"> To understand the basic physiological concepts of Renal physiology To understand the basic physiological concepts of Endocrinology & Reproductive physiology To understand the basic physiological concepts of CNS, Special senses,

Sr. No.	Topics	No. of Hrs.
1	Nervous system -Functions of Nervous system , Neuron – Conduction of Impulses, factors affecting, Synapse- transmission, Receptors, Reflexes Ascending tracts, Descending tracts, Functions of various parts of the Brain.Cerebro-Spinal Fluid (CSF): Composition, functions & Circulation, Lumbar Puncture, Autonomic Nervous System (ANS): Functions.	10
2	Special senses- Vision: Structure of Eye, functions of different parts, Refractive errors of Eye and correction, Visual Pathway, Colour vision & tests for colour Blindness, Hearing: Structure and function of ear, Mechanism of Hearing, Tests for Hearing (Deafness)	6
3	Skin - Structure and function, Body temperature,Regulation of Temperature & fever.	4
4	Endocrine System - Short description of various endocrine glands and their functions	2
5	Reproductive systems - Structure & Functions of Reproductive system, Male Reproductive System: spermatogenesis, Testosterone, Female reproductive system: Ovulation, Menstrual cycle, Oogenesis, Tests for Ovulation, Oestrogen&Progesterone , Pregnancy test, Parturition. Contraceptives, Lactation: Composition of Milk, advantages of breast Feeding.	4
6	Excretory System General Introduction, structure & functions of kidney, Renal circulation, Glomerular filtration & tubular reabsorption, Nephron, Juxta Glomerular Apparatus,Mechanism of Urine formation, Micturition, Cystomatogram.Diuretics, Artificial Kidney.	4
Total		30hrs

BMDT 107 P - Human Physiology Part II –(Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Recording of body temperature	30
2	Examination of sensory system	
3	Examination of motor system	
4	Examination of Eye	
5	Examination of ear	
Total		30 hrs

Textbooks:

1. Basics of medical Physiology –D Venkatesh and H.H Sudhakar, 3rd edition.
2. Principles of Physiology – DevasisPramanik, 5th edition.
3. Human Physiology for BDS –Dr A.K. Jain, 5th edition.
4. Textbook of human Physiology for dental students-Indukhurana 2nd edition.
5. Essentials of medical Physiology for dental students –Sembulingum.

Reference books:

1. Textbook of Medical Physiology, Guyton , 2nd South Asia Edition.
2. Textbook of Physiology Volume I & II (for MBBS) – Dr. A. K. Jain.
3. Comprehensive textbook of Medical Physiology Volume I & II – Dr. G. K. Pal.

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	General Microbiology
Course Code	BMDT 108 L

Teaching Objective	<ul style="list-style-type: none"> • To introduce basic principles and then applies clinical relevance in four segments of the academic preparation for paramedical: immunology, bacteriology, mycology, and virology. This rigorous course includes many etiological agents responsible for global infectious diseases.
Learning Outcomes	<ul style="list-style-type: none"> • Upon completion, students should be able to demonstrate knowledge of microorganisms and the disease process as well as aseptic and sterile techniques. • Perform microbiological laboratory procedures according to appropriate safety standards

Sr. No.	Topics	No. of Hrs.
1	Concepts and Principles of Microbiology - Historical Perspective, Koch's Postulates, Importance of Microbiology, Microscopy, Classification of Microbes.	4
2	General Characters of Microbes - Morphology, staining methods, Bacterial growth & nutrition, Culture media and culture methods +ABS, Collection of specimen, transport and processing, Antimicrobial mechanism and action, Drug Resistance minimization.	6
3	Sterilization and Disinfection - Concept of sterilization, Disinfection aseptis, Physical methods of Sterilization, Chemical methods (Disinfection), OT Sterilization, Biological waste and Biosafety & Biohazard.	5
4	Infection and Infection Control - Infection, Sources, portal of entry and exit, Standard (Universal) safety Precautions & hand hygiene, Hospital acquired infections & Hospital Infection Control	3
5	Immunity - Types Classification, Antigen, Antibody – Definition and types, Ag-Ab reactions – Types and examples, Procedure of Investigation & Confidentiality, Immunoprophylaxis – Types of vaccines, cold chain, Immunization Schedule.	6
6	Systemic Bacteriology (Morphology, diseases caused, specimen collection & lists of laboratory tests) – Introduction, Gram Positive Cocci & Gram Negative Cocci, Enterobacteraceae & Gram negative bacilli, Mycobacteria, Anaerobic bacteria & Spirochaetes, Zoonotic diseases, Common Bacterial infections of eye.	7
7	Mycology - Introduction, Classification, outline of lab diagnosis, List of Fungi causing: Common fungal infections of eyes, Superficial Mycoses, Deep mycoses & opportunistic, Fungi.	3
8	Virology - Common Viral infection of eye, Introduction, General Properties, outline of lab diagnosis & Classification, HIV Virus, Hepatitis -B Virus.	4
9	Parasitology – Morphology, Life Cycle & Outline of Lab Diagnosis & Classification, Common parasite infection of eye, Protozoa- E. histolytica, Malarial Parasite, General properties, classification, list of diseases caused by: Cestodes and Trematodes, Intestinal Nematodes & Tissue Nematodes, Vectors.	7
Total		45 hrs

BMDT 108 P - General Microbiology (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Concepts and Principles of Microbiology	60
2	General Characters of Microbes	
3	Sterilization and Disinfection	
4	Infection and Infection Control	
5	Immunity	
6	Systemic Bacteriology (Morphology, diseases caused, specimen collection & lists of laboratory test)	
7	Mycology	
8	Virology	
9	Parasitology	
Total		60 hrs

Text Book:

1. Text Book of Microbiology for Nursing Students, AnantNarayanPanikar
2. Text Book of Ophthalmology, Khurana

Reference Book:

1. Text Book of Microbiology, Baveja.

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Basic Pathology & Hematology
Course Code	BMDT 109 L

Teaching Objective	<ul style="list-style-type: none"> • Understand the importance of clinical information in supporting a timely, accurate pathological diagnosis. • Describe normal and disordered hematopoiesis • Develop implement and monitor a personal continuing education strategy and critically appraise sources of pathology related medical information. • Describe mechanisms of oncogenesis&demonstrate an understanding of genetics and cytogenetics pertaining to hematology
Learning Outcomes	<ul style="list-style-type: none"> • The student should submit the appropriate tissue sections per protocol to demonstrate the lesion and other clinically-relevant information needed for the final pathologic report • To aid hematology in the reference ranges for hemoglobin, hematocrit, erythrocytes, and leukocytes in infants, children and adult.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Pathology	1
2	Working and maintenance of instruments	2
3	General principles of Haematology techniques, blood collection, anticoagulants, fixation, processing, routine staining, Haemoglobin, TLC, DLC, Peripheral smear (CBC report), platelet counts, cell counter working	10
4	General principles of Histopathology techniques collection, fixation, processing & routine staining	3
5	General principles of Cytopathology techniques collection, fixation, processing & routine staining	5
6	General principles of Clinical Pathology techniques sample collection, processing for routine test, normal urine & urine examination, urine strip, introductions to body fluids (Distinguish between Transudate and exudate)	10
7	General principles of Blood Bank techniques antigen, antibody, ABO & Rh system	5
8	General principles of Autopsy & Museum	4
9	General Pathology including introduction to : I) Cell Injury (Reversible, Irreversible cell injury) II) Inflammation (Acute inflammation, cells, Chronic inflammation, granuloma and examples) III) Circulatory disturbances (Thrombosis, Embolism, Edema- ascetic, pleural, pericardial- effusions, Shock, Allergy, Anaphylaxis-Definition, Morphological features,	8

	And distinguishing features) IV)Neoplasia (Definition of Anaplasia, dysplasia, metaplasia and metastasis and difference between benign and malignant lesions)	
10	Systemic pathology basis and morphology of common disorders like I)Anemia(types-Iron deficiency, megaloblastic, Aplastic-Etiology, Pathogenesis Investigation)- II)Leukemia (Acute and chronic, Peripheral smear), AIDS(Definition, Pathogenesis, Mode of transmission, Two Confirmatory test Tridot, Western blot), Hepatitis (Types, Etiology, Mode of spread) III)Malaria-(Mode of spread IV)Tuberculosis-(Primary and secondary tb, Granuloma formation, Mode of transmission, Organs involved	8
11	Maintenance and medicolegal importance of records and specimens, Lab information system(LIMS)	3
12	Biomedical Waste, Universal Safety Precaution(Protocol to be followed after -Needle injury, chemical injury	1
Total		60hrs

BMDT 109 P – Basic Pathology & Hematology (Demonstration)

Sr. No.	Topics	No. of Hrs.
1	Working and maintenance of instruments,	60
2	General principles of Haematology techniques, blood collection, anticoagulants, fixation, processing, routine staining, Haemoglobin, TLC, DLC, Peripheral smear (CBC report), platelet counts, cell counter working	
3	General principles of Histopathology techniques collection, fixation, processing & routine staining	
4	General principles of Cytopathology techniques collection, fixation, processing & routine staining	
5	General principles of Clinical Pathology techniques sample collection, processing for routine test, normal urine & urine examination, urine strip, introductions to body fluids (Distinguish between Transudate and exudate)	
6	General principles of Blood Bank techniques antigen, antibody, ABO & Rh system	
7	General principles of Autopsy & Museum	
Total		60hrs

Reference Books:

1. *A Handbook of Medical Laboratory (Lab) Technology: Editor) Second Edition. V.H. Talib (Ed.).*
2. *Comprehensive Textbook Of Pathology For Nursing: Pathology Clinical Pathology Genetics. Ak Mandal Shramana Choudhury, Published by Avichal Publishing Compnay | Language English*
3. *Textbook of Medical Laboratory Technology- Praful B. Godkar, Darshan P. Godkar*
4. *Medical Laboratory Technology. Methods and Interpretations – Ramnik Sood (volume 1&2)*
5. *Medical Laboratory technology a procedure manual for routine diagnostic test – vol – I, II, III. Kanai L. Mukharjee Tata Mc graw hill pub. New Delhi.*
6. *Practical Pathology P. Chakraborty Gargi Chakraborty New Central Book Agency, Kolkata.*
7. *Theory & Practice of Histological Techniques John D. Bancroft et.al. Churchill Livingstone Printed in China.*
8. *Histochemistry in Pathology M.I. Filipe et.al. Churchill Livingstone, London*
9. *Hand Book of Histopathological & Histochemical Techniques C.F.A. Culling Butterworths Company Ltd. London.*
10. *A Handbook of Medical Laboratory (Lab) Technology. By V.H Talib.*

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Introduction to Quality and Patient safety
Course Code	BMDT 110 L

Teaching Objective	<ul style="list-style-type: none"> • The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system. • To understand the basics of emergency care and life support skills. • To Manage an emergency including moving a patient • To help prevent harm to workers, property, the environment and the general public. • To provide a broad understanding of the core subject areas of infection prevention and control. • To provide knowledge on the principles of on-site disaster management
Learning Outcomes	<ul style="list-style-type: none"> • Upon completion, Students should be able to apply healthcare quality improvement and patient safety principles, concepts, and methods at the micro-, meso-, and macro-system levels.

Sr. No.	Topics	No. of Hrs.
1	Quality assurance and management – Concepts of Quality of Care, Quality Improvement Approaches, Standards and Norms, Introduction to NABH guidelines	7
2	Basics of emergency care and life support skills - Basic life support (BLS), Vital signs and primary assessment, Basic emergency care – first aid and triage, Ventilations including use of bag-valve-masks (BVMs), Choking, rescue breathing methods, One- and Two-rescuer CPR	7
3	Bio medical waste management and environment safety -Definition of Biomedical Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including color coding), Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste, BMW Management & methods of disinfection, Modern technology for handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling of cross infection (Protective devices)	8
4	Infection prevention and control - Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],Prevention & control of common healthcare associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection Control	8
5	Antibiotic Resistance - History of Antibiotics, How Resistance Happens and Spreads, Types of resistance- Intrinsic, Acquired, Passive, Trends in Drug Resistance, Actions to Fight Resistance, Bacterial persistence, Antibiotic sensitivity, Consequences of antibiotic resistance	8
6	Disaster preparedness and management - Fundamentals of emergency management, Psychological impact management, Resource management, Preparedness and risk reduction, information management, incident command and institutional mechanisms.	7
Total		45 hrs

Reference Books:

1. Washington Manual of Patient Safety and Quality Improvement Paperback – 2016 by Fondahn (Author)
2. Understanding Patient Safety, Second Edition by Robert Wachter (Author)
3. Handbook of Healthcare Quality & Patient Safety Author : Girdhar J Gyani, Alexander Thomas
4. Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, Lene Schibevaag
5. Old) Handbook Of Healthcare Quality & Patient Safety by Gyani Girdhar J (Author)
6. Handbook of Healthcare Quality & Patient Safety by .Gyani G J/Thomas A
7. Quality Management in Hospitals by S. K. Jos

BMDT 111 P - Community orientation & clinical visit (including related practicals to the parent course)(Total -120 hrs)

SKILL ENHANCEMENT ELECTIVE COURSE

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Medical Bioethics & IPR
Course Code	SEC 001 L

Teaching Objective	<ul style="list-style-type: none"> • To introduce the wide range of ethical issues in health care. • To provide basic skills in: A) Approaching ethical issues. B) Analysis and statement of issues. C) Understanding the relevant ethical principles invoked. • Imparting knowledge and skills that will enable students to develop ethical answers to these issues • To acquire specialized knowledge of law and IPR. • The main objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work.
Learning Outcomes	<ul style="list-style-type: none"> • Upon successful completion of the course, students will be able to: Recognize what constitutes an ethical concern in health care • Understanding ethical issues in Health care. • Understand better the complexity and multi-dimensionality of medical ethical concerns and uniqueness of each problem. • Capacity to rationally justify your decision • Develop the ability to reason through difficult medical/clinical ethical issues both orally, in the context of a group of their peers, and through written • The students get awareness of acquiring the patent and copyright for their innovative works. • They also get the knowledge of plagiarism in their innovations which can be questioned legally.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Bioethics Bioethical issues related to Healthcare & Medicine	5
2	Anatomy - Cadaver ethics, Human dignity, PNDT, Disposal of cadaver, Genetic Counseling	7
3	Physiology - Animal ethics, Health policy privacy	7
4	Biochemistry & Pathology - Prudence of investigation confidentiality, Patients bill of rights, Disposal of investigative material, Integrity, Blood transfusion	5
5	Pharmacology - Rational drug prescribing, Clinical trials, Risk minimization, Animal ethics	5
6	Microbiology - Hand wash, Drug resistance minimization, Prudence of investigation confidentiality, Sterilization procedure, Biosafety and bio hazard	5
7	Medicolegal aspects of medical records	3
8	Introduction to Intellectual Property: Concept of Intellectual Property Kinds of Intellectual Property Patents, Copyrights Designs, Trademarks, Geographical Indication, Infringement of IPR, Its protection and Remedies Licensing and its types	8
Total		45hrs

Reference Books:

1. Contemporary issues in bioethics – Beauchamp & Walters (B&W) 4th edition.
2. Classic philosophical questions by Glouck (8th Edition)
3. Case book series and booklets by UNESCO Bioethics Core curriculum 2008
4. Encyclopedia of Bioethics 5 vol set, (2003) ISBN-10: 0028657748
5. Intellectual property rights- Ganguli-Tat McGrawhill. (2001) ISBN-10: 0074638602,
6. Intellectual Property Right- Wattal- Oxford Publication House.(1997) ISBN:0195905024.

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Human Rights & Professional Values
Course Code	SEC 002 L

Teaching Objective	<ul style="list-style-type: none"> • To understand interaction between society and educational institutions. • To sensitize the citizens so that the norms and values of human rights and duties of education programme are realized. • To encourage research activities. • To encourage research studies concerning the relationship between Human Rights and Duties Education.
Learning Outcomes	<ul style="list-style-type: none"> • This course will aim at making the learners acquire conceptual clarity and develop respect for norms and values of freedom, equality, fraternity and justice. • It will include awareness of civil society organizations and movements promoting human rights. • This will make the students realize the difference between the values of human rights and their duties

Sr. No.	Topics	No. of Hrs.
1	Background - Introduction, Meaning, Nature and Scope, Development of Human Rights, Theories of Rights, Types of Rights	6
2	Human rights at various level- Human Rights at Global Level UNO, Instruments: U.N. Commission for Human Rights, European Convention on Human Rights.	6
3	Human rights in India - Development of Human Rights in India, Human Rights and the Constitution of India, Protection of Human Rights Act 1993- National Human Rights Commission, State Human Rights Commission, Composition Powers and Functions, National Commission for Minorities, SC/ST and Woman	7
4	Human Rights Violations -Human Rights Violations against Women, Children, Violations against Minorities SC/ST and Trans-genders, Preventive Measures.	6
5	Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality	6
6	Personal values- ethical or moral values, Attitude and behavior- professional behavior, treating people equally	6
7	Code of conduct- professional accountability and responsibility, misconduct, Cultural issues in the healthcare environment	8
Total		45hrs

Reference Books:

1. JagannathMohanty Teaching of Human sRights New Trends and Innovations Deep & Deep Publications Pvt. Ltd. New Delhi2009
2. Ram Ahuja: Violence Against Women Rawat Publications Jewahar Nager Jaipur.1998.
3. SivagamiParmasivam Human Rights Salem 2008
4. Hingorani R.C.: Human Rights in India: Oxford and IBA New Delhi.

SECOND YEAR

(B.Sc. Medical Dialysis Technology)

SEMESTER-III

Code No.	Core Subjects
Theory	
BMDT 112 L	Introduction To Dialysis
BMDT 113 L	Fundamentals of Dialysis
BMDT 114 L	Pharmacology in Dialysis
BMDT 115 CP	MDT Directed Clinical Education-I
Practical	
BMDT 112 P	Introduction To Dialysis
BMDT 113 P	Fundamentals of Dialysis
Generic Elective Course	
GEC 001 L	Pursuit of Inner Self Excellence (POIS)
GEC 002 L	Organizational Behavior

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Introduction to Dialysis
Course Code	BMDT 112 L

Teaching Objective	<ul style="list-style-type: none"> • To enable students, understand the fundamental of dialysis • To teach students about maintenance of the Dialysis machine, tubing's.
Learning Outcomes	<ul style="list-style-type: none"> • Practice personal safety & standard precautions. • Handling complications during dialysis procedures. • Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Sr. No.	Topics	No. of Hrs.
1.	Anatomy & Physiology (normal kidney structure and functions), Derangement of kidney functions (aetiology, clinical manifestation, diagnosis of acute and chronic renal failure)	12
2.	Dialysis – the concept (Brief history, definition, mechanism) : 4 hours Components of Dialysis Access, blood flow, anticoagulant, dialysate)	10
3.	Hemodialysis – Basics (Blood circuit: tubing, pump, dialyzer, flow rate, dialysate circuit, concentrates, delivery systems, flow rate)	10
4.	Anticoagulation (Heparin, alternatives to Heparin, regional no anticoagulation), Vascular access (Temporary, Permanent)	8
5.	Dialysis water and water treatment: Dialysis and Dialyzer (including reuse)	5
Total		45 hrs

BMDT 112 P – Introduction to Dialysis

Sr. No.	Topics	No. of Hrs.
1	A Hemodialysis unit	4
2	Demineralization plant	6
3	Machine	6
4	Initiation of Dialysis	4
5	Conduction of Dialysis	4
6	Dialysis – closure	10
7	Washing, cleaning, reuse	10
8	Maintenance of hygiene in Dialysis unit	6
9	Access – core	6
10	Anticoagulation	4
Total		60 hrs

Recommended Learning Resources:**Text Books:**

1. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese
2. Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
3. Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed, Elsevier: St Louis
4. Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi

Reference books or related websites: www.osmosis.org

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Fundamentals of Dialysis
Course Code	BMDT 113 L

Teaching Objective	<ul style="list-style-type: none"> • To enable students, understand the correct cannulation techniques. • To demonstrate patient positioning and preparation • To teach students about maintenance of the Dialysis machine, tubing's.
Learning Outcomes	<ul style="list-style-type: none"> • Practice personal safety & standard precautions. • Handling complications during dialysis procedures. • Understand Infectious diseases, mode of transmission, prevention & care of the patient in a Dialysis Unit.

Sr. No.	Topics	No. of Hrs.
1	Medical Abbreviations& Patient pedigree: Common medical abbreviations, Patient encounter, History taking of patient: - Present, Past, Family History.	5
2	Physical Examination: Inspection of whole body of the patient e.g. Chest, abdomen, pedal edema & Facial edema. Significance of edema as per the dialysis patient concern. Palpation – Method for palpation, Percussion - Resonance, hyper-resonance and dullness, Heart sounds & murmurs & any other abnormal body sound.	10
3	Vital signs: Assessing Pulse - Radial, Brachial, Apical & Femoral, Assessing Respiration - Normal rhythm and rate, Common disorders, Assessing Blood Pressure - Normal values, Hyper and hypotension, Assessing Temperature - Methods, Common abnormalities.	5
4	Safety Practices: Identify specific risks associated with any work activities undertaken as a renal dialysis technician, The principles and practice of health and safety at work. Safe lifting and handling techniques when moving equipment and/or supplies. Correct handling procedures for chemicals and toxic agents. Health and Safety regulations and guidance, the consequences of current flow within the body& control measures to be taken to manage risks, clinical risks posed by the application of technologies to treat	5

	renal disease. Patient Welfare, Safety and Confidentiality.	
5	Aseptic Technique: Hand Washing: Medical & surgical Management, use of appropriate personal protective equipment for all personnel involved in the renal area, type and range of personal protective equipment and the reasons for their use. Procedures for infection control within the renal environment. Methods to control spread of infection by hospital personnel.	10
6	Patient Management: Cannulating, Line cannula termination. Positioning during the procedure of dialysis. Essential Care: Blood leaks, clotting, acute bleeding, hypotension, hypertension, fever, nausea, pyrogenic vomiting, headache, cardiac arrhythmias, chest pain, reactions muscle cramps, restlessness pruritus, convulsion, hemolysis. Total patient care: Nutritional consideration in CKD and dialysis patient, Diet, hygiene, fluid, rehabilitation. Recording and reporting.	10
Total		45hrs

BMDT 113 P – Fundamentals of Dialysis

Sr. No.	Topics	No. of Hrs.
1	Checking Vitals	10
2	Physical Examination	10
3	Patient and Technologist safety practices	10
4	Aseptic Techniques	10
5	Medication techniques (Demo): Oral, IM, IS, IV & cathedral	10
6	Diet Plan & Intake and output plan	10
Total		60 hrs

Recommended Learning Resources:

Text Books:

1. Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
2. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
3. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

Reference books or related websites: www.osmosis.org , National Kidney foundation,
NANT

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Pharmacology in Dialysis
Course Code	BMDT 114 L

Teaching Objective	<ul style="list-style-type: none"> •This course is designed to enable students to acquire understanding of Pharmacodynamics •Pharmacokinetics and principles of therapeutics and Dialysis implications.
Learning Outcomes	<p>At the end of the course the students are able to:</p> <ul style="list-style-type: none"> • Understand the basic concepts of pharmacology • Understand the pharmacology of common chemotherapeutics. • Understand common antiseptics, disinfectants and insecticides. • Understand drug acting on various systems of human body. • Understand alternative systems of medicines.

Sr. No.	Topics	No. of Hrs.
1	Introduction to Pharmacology: Definitions, Terminology used, Types: Classification, Pharmacodynamics: Actions, therapeutic, Adverse, toxic effects, Pharmacokinetics: Absorption, distribution, metabolism, interaction, excretion, Review: Routes and principles of administration of drugs, Indian pharmacopoeia: Legal issues, Storage of various drugs, Calculation of drugs dosage, Rational use of drugs, Principles of therapeutics in Kidney Dialysis	5
2	Fluid therapy with special emphasis in renal diseases: Define IV fluids, differentiate the various IV fluids. Use of crystalloids and colloids in renal diseases. Mode of action, contraindication, precautions and side effects of using various IV fluids.	5
3	Anti hypertensive Definition, classification, actions, dosage, side effects &	5

	contraindications, special reference during dialysis, vasopressors, drugs used in Hypotension	
4	Drugs & dialysis Dose & duration of drugs used in dialysis. The administration of drugs and the effect of dialysis on the action of drugs	3
5	Dialyzable drugs List of drugs that are dialyzable, action, dosage, side effects and contraindications of phenobarbitone, lithium, methanol etc	2
6	Heparin including low molecular weight heparin Introduction to heparin and Low molecular weight heparin. Description of Heparin & LMWH, pharmacokinetics, mode of action, indications and use, dosage and route of administration & side effects	5
7	Protamine sulphate Introduction to protamine, mode of action, pharmacokinetics, indications, uses, dosage, route of administration, side effects, precautions, contraindications	5
8	Formalin, sodium hypochlorite, hydrogen peroxide Action, characteristics, the use of the drugs and its role as disinfectants & adverse effects of residual particles applicable too formalin	5
9	Hemodialysis: concentrates Composition & dilution (acetate & bicarbonates). Peritoneal dialysis fluid in particular hypertonic solutions – composition Fluids used in peritoneal dialysis, the composition and strength of concentration. Mode of action, uses, indications and precaution	5
10	Potassium exchange resins with special emphasis on mode of administration Introduction to potassium exchange resins, chemical composition. Types, mode of action, indications for use, side effects, precautions and contraindications	5
Total		45 hrs

Recommended Text Books:

1. Satoskar, Bhandarkar, Ainapure: Pharmacology and Pharmacotherapeutics, 18 Edition Popular Prakashan Mumbai.
2. M M Das: Pharmacology, Books & Allied (p) Ltd, 4 Edition 2001.

3. Linda, Skidmore Roth: Mosby's 2000 Nursing Drug Reference, Mosby Inc, Harcourt Health Sciences Company, Missouri 2000.
4. Ramesh Karmegan: First aid to Pharmacology for undergraduates, Paras Medical publishers, Hyderabad, India, 1 Edition 2003.
5. Rodman & Smith: Clinical pharmacology in nursing, 2 Edition, J B Lippincott company, Philadelphia.
6. Tripathi K.D. (2008) Essentials of Pharmacology 6th Ed, Jaypee Brothers medical publishers: New Delhi 2. Rang H.P., (1995) Pharmacology 3rd Ed, and Churchill Livingstone: Michigan
7. Himmelfarb, J., Savegh, M. H.,(2010) Chronic Kidney disease, Dialysis, transplantation: Companion to Brenner & Rector's Kidney 3rd Ed, Elsevier: St Louis
8. Tripathi, K.D.,(2010). Pharmacological Classification of drugs, doses and Preparations 4th Ed, Jaypee Brothers medical publishers: New Delhi
9. Ajay, P., Medhi - Bikash (2010). Pharmacology, Jaypee Brothers medical publishers: New Delhi

Reference books or related websites: www.123sonography.com

Course code- BMDT 115 CP: MDT Directed Clinical Education – I

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students will apply knowledge from clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical cardiac care skills.

(Total- 360 hrs)

GENERIC ELECTIVE COURSE

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Pursuit of Inner Self Excellence (POIS)
Course Code	GEC 001 L

Teaching Objective	<ul style="list-style-type: none"> • To inculcate moral values in students – Self-Discipline , Time Management, Develop attitude of Service with humility, Empathy, Compassion, brotherhood, Respect for teachers, colleagues & society members. • Develop Effective means of communication & presentation skills in students • To develop wisdom in students for deciding their career based on their areas of interest and inner skills. • Introduce techniques for Relaxation, Meditation & Connecting with inner self. • Rejuvenation Techniques which can be used by students to distress themselves •To improve performance of students during various assignments, projects, elocutions, events, quiz, interviews.
Learning Outcomes	<ul style="list-style-type: none"> • Students will become self dependent, more decisive and develop intuitive ability for their study and career related matter. • Student’s ability to present their ideas will be developed. •Enhanced communication skills, public speaking & improved Presentation ability. • Students will be able to explore their inner potential and inner ability to become a successful researcher or technician & hence become more focused. • Students will observe significant reduction in stress level. • With the development of personal attributes like Empathy, Compassion, Service, Love & brotherhood, students will serve the society and industry in better way with teamwork and thus grow professionally.

Sr. No.	Topics	No. of Hrs.
1	Spiritual Values for human excellence : The value of human integration; Compassion, universal love and brotherhood (Universal Prayer) ; Heart based living ; Silence and its values, Peace and non-violence in thought, word and deed ; Ancient treasure of values - Shatsampatti , Patanjali'sAshtanga Yoga ,Vedic education - The role of the Acharya , values drawn from various cultures and religious practices - Ubuntu, Buddhism, etc.; Why spirituality? Concept – significance ; Thought culture	10
2	Ways and Means : Correlation between the values and the subjects ;Different teaching techniques to impart value education; Introduction to Brighter Minds initiative; Principles of Communication; Inspiration from the lives of Masters for spiritual values - Role of the living Master	15
3	Integrating spiritual values and life: Relevance of VBSE (Value Based Spiritual Education) in contemporary life ; Significant spiritual values ; Spiritual destiny ; Principles of Self-management; Designing destiny	10
4	Experiencing through the heart for self-transformation (Heartfulness Meditation): Who am I? ; Introduction to Relaxation; Why, what and how HFN Meditation?; Journal writing for Self-Observation ; Why, what and how HFN Rejuvenation (Cleaning)? ; Why, what and how HFN connect to Self (Prayer)?; Pursuit of inner self excellence ; Collective Consciousness-concept of <i>egregore effect</i> ;	10
Total		45 hrs

Books:

- The Art of Learning: **A Journey in the Pursuit of Excellence**, Josh Waitzkin, Simon and Schuster, 2007
- Reality at Dawn. By Shri Ram Chandra, Published by ISRC

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Organizational Behavior
Course Code	GEC 002 L

Teaching Objective	<ul style="list-style-type: none"> • To understand the initial insights into underlying principles and fundamental theories of organizational behavior. • The Student should develop a sense of what falls under the domain of organizational behavior. • He should develop an understanding of academic views on the behavior and motivations of people in organizations and the purposes of organizations. • This course clearly takes an academic and scientific lens with the aim of understanding human behavior in organizations.
Learning Outcomes	<ul style="list-style-type: none"> • Describe and apply motivation theories to team and organizational scenarios in order to achieve a team's or an organization's goals and objectives. • Explain the effect of personality, attitudes, perceptions and attributions on their own and others' behaviors in team and organizational settings. • Explain types of teams and apply team development, team effectiveness, and group decision making models and techniques. <p>Analyze and apply leadership theories and better understand their own leadership style.</p>

Sr. No.	Topics	No. of Hrs.
1	Organizational Behavior - Definition - Importance - Historical Background - Fundamental concepts of OB - 21st Century corporate - Different models of OB i.e. autocratic, custodial, supportive	6
2	Organization Structure and Design - Authority and Responsibility Relationships - Delegation of Authority and Decentralization - Interdepartmental Coordination - Emerging Trends in Corporate Structure, Strategy and Culture - Impact of Technology on Organizational design - Mechanistic vs Adoptive Structures – Formal and Informal Organization	8
3	Perception Process - Nature & Importance - Perceptual Selectivity - Perceptual Organization - Social Perception - Impression Management	6
4	Learning - Process of Learning - Principles of Learning - Organizational Reward Systems - Behavioral Management	6
5	Motivation - Motives - Characteristics - Classification of motives - Primary Motives - Secondary motives - Morale - Definition and relationship with productivity - Morale Indicators	6
6	Leadership - Definition - Importance - Leadership Styles - Models and Theories of Leadership Styles	7

7	Conflict Management - Traditional vis-a-vis Modern view of conflict - Constructive and Destructive conflict - Conflict Process - Strategies for encouraging constructive conflict - Strategies for resolving destructive conflict	6
Total		45 hrs

Books:

1. Organizational Behavior, 9th Ed. - Stephen Robbins
2. Human Behaviour at work - Davis and Newstorm
3. Organizational Behaviour - Uma Sekaran
4. Organizational Behaviour - Fred Luthans
5. Organizational Behaviour - K.Aswathappa
6. Human Behaviour at Work - Keith Davis
7. Organizational Behaviour - Jit S.Chandran
8. Human Relations & Organizational Behaviour - R.S.Dwivedi
9. Organizational Behaviour - McShane

SECOND YEAR
B.Sc. Medical Dialysis Technology

SEMESTER-IV

Code No.	Core Subjects
Theory	
BMDT 116 L	Concept of Renal Disease & Disorders
BMDT 117 L	Nutrition in Dialysis
BMDT 118 CP	MDT Directed Clinical Education-II
Practical	
BMDT 116 P	Concept of Renal Disease & Disorders
BMDT 119	Seminar
Ability Enhancement Elective Course	
AEC 003 L	Computer and Applications
AEC 004 L	Biostatistics and Research Methodology

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Concept of Renal Disease & Disorders
Course Code	BMDT 116 L

Teaching Objective	<ul style="list-style-type: none"> • Describe the purpose, significance of results related to diagnostic studies of the urinary system. • Comprehend the congenital abnormalities of the urinary system. • Describe the appropriate techniques used in the physical assessment and significant subjective and objective data related to the urinary system • Describe the purpose, significance of results related to diagnostic studies of the urinary system • Comprehend the congenital abnormalities of the urinary system • Classify and enumerate kidney diseases, including Glomerular, tub interstitial and vascular diseases
Learning Outcomes	<ul style="list-style-type: none"> •To develop understanding regarding different disorder and its management. •To develop knowledge in childhood anomalies' and it's significance.

Sr. No.	Topics	No. of Hrs.
1	Assessment and Diagnostic studies of the Urinary system: Physical assessment of a person with kidney disease, basics of assessment, list various diagnostic tests done for kidney diseases, Laboratory tests, imaging studies, normal values, interpretation of the tests including the roles and responsibilities of a technologist.	10
2	Classification of renal diseases: Define renal disorders, introduction to the classification of the various types of renal disorders.	5
3	Glomerular diseases – causes, types & pathology: Definition, etiology, type's pathophysiology, medical and surgical management.	5
4	Tubulointerstitial diseases & Renal vascular disorders, asymptomatic urinary abnormalities: Definition, etiology, type's pathophysiology, medical and surgical management.	5
5	Obstructive Diseases: Acute Kidney Injury & End stage renal diseases, Obstructive Uropathies– Causes & pathology, renal calculi & renal tumors: definition, etiology, type's pathophysiology, medical and surgical management.	5
6	Congenital & Inherited Renal Diseases: Peniel, scrotum, urinary bladder, Kidney: size, shape, positioning malformation: definition, cause and its management.	5
7	Pathology of kidney in hypertension, diabetes mellitus, pregnancy: Pathology of peritoneum – peritonitis – bacterial, tubercular & sclerosing Peritonitis, urinary tract	5

	infections, Pyelonephritis & tuberculosis pyelonephritis	
8	Pathology of peritoneum, UTI & nephritis: peritonitis, bacterial, tubercular & sclerosing Peritonitis, Pathology of urinary tract infections- common organisms involved, Pyelonephritis & tuberculous pyelonephritis: definition, etiology, types pathophysiology, medical and surgical management.	10
9	Dialysis In ICU: Emergency care & Intensive care of a dialysis patient, Principles of Extracorporeal Short-Wave Lithotripsy, Plasmapheresis, CRRT & SLED, common urosurgical procedures & instruments and their maintenance, Preparation of dialysis patients for various surgical procedure and post-operative Dialysis support, Basic and advanced cardiac life support.	10
Total		60 hrs

BMDT 116 P – Concept of Renal Disease & Disorders

Sr. No.	Topics	No. of Hrs.
1	Care of Patient with CKD	5
2	Care of Patient with ARF	5
3	Health teaching on prevention of UTI	10
4	Health teaching on prevention of peritonitis	10
Total		30 hrs

Recommended Learning Resources:

Text Books:

1. Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press
2. Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
3. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins
4. Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer
5. Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley

Reference books or related websites: www.osmosis.org , www.khanacademy.org

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Nutrition in Dialysis
Course Code	BMDT 117 L

Teaching Objective	<ul style="list-style-type: none"> •Discuss the basic nutrition and their role in growth, development, maintained and restoration •Articulate the rationale for calculating body mass index (BMI) in nutritional assessment of dialysis patients.
Learning Outcomes	<ul style="list-style-type: none"> • To describe basic nutrient and their role in growth, development, health maintained and restoration. • To identify and interpret appropriate dietary plan for dialysis patient.

Sr. No.	Topics	No. of Hrs.
1	Introduction Nutrition in Dialysis: Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition, food selection, storage & preservation, prevention of food adulteration.	5
2	<p>Types of nutrients: protein, carbohydrate, lipids, vitamins, minerals, water. And their calorie values and calculation</p> <p>Carbohydrates: Monosaccharides: glucose, fructose, galactose. Disaccharides - Maltose, lactose, sucrose. Polysaccharide: Dextrin, starch, glycogen, resistance starch.</p> <p>Proteins - Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.</p> <p>Lipids - Sources, daily requirements, functions. Digestion & Absorption. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid</p> <p>Water – sources of drinking water, requirements, preservation of water.</p> <p>Vitamins - types, sources, requirements deficiencies of vitamins</p>	15
3	Energy in Human Nutrition: Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements deficiency and excess, Determination of Energy in food, B.M.R. and its regulation, -S.D.	5

4	Clinical Signs: Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs, other disease and disorders in relation with renal conditions.	5
5	Nutritional anthropometry: Need and importance, standard for reference, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart of dialysis patient.	5
6	Minimum Nutritional Requirement for dialysis patients and RDA: Formulation of RDA and Dietary Guidelines Reference Man and Reference Woman. Adult consumption unit. Planning nutritional diet & maintenance of Intake output charts of dialysis patient	10
Total		45hrs

Recommended Learning Resources:**Text Books:**

1. Jelliffe, D. B. : Assessment of the Nutritional Status of the Community; World Health Organisation.
2. Sain, D. R. Lockwood, R., Scrimshaw, N. S. : Methods the Evaluation of the Impact of Food and Nutrition Programmes, United Nations University.
3. Ritchie, J.A.S. : Learning Better Nutrition FAO, Rome.
4. Gopalan. C,: Nutrition Foundation of India, Special Publication service.
5. Beghin, I. Cap. M: Dujardan. B. : A Guide to Nutrition Status Assessment. W. H. O. Geneva. Gopaldas, t. Seshadri, S. : Nutrition Monitoring a Assessment: Oxford University Press.
6. Mason, J. B., Habicht, J. P.; Tabatabai. H. Valverde. U. : Nutritional Surveillance, W.H.O.

Course code- BMDT 118 CP: MDT Directed Clinical Education – II

Students will gain additional skills in medical equipment and radiation safety techniques. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate technical skills.

(Total-450 hrs)

Name of the Programme	B.Sc. Medical Dialysis Technology
Course Code	BMDT 119
Name of the Course	SEMINAR

For seminar/presentation there will be a maximum of 50 marks. Seminar / presentations will be evaluated by the teachers of the dept. The marks obtained in the same will be kept confidentially with the Head of the Dept. and will be submitted along with the internal assessment marks.

ABILITY ENHANCEMENT ELECTIVE COURSE

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Computer and Applications
Course Code	AEC 003 L

Teaching Objective	<ul style="list-style-type: none"> • Learn IT applications in medicine and allied health care field. • Introduction to health informatics. • Understand the theories and practices adopted in Hospital Information Systems in the light of medical standards, medical data formats and recent trends in Hospital Information Systems.
Learning Outcomes	<ul style="list-style-type: none"> • Discuss about health informatics and different IT applications in allied health care. • Explain the function of Hospital Information Systems • Analyze medical standards

Sr. No.	Topics	No. of Hrs.
1	Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.	1
2	Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).	3
3	Processor and memory: The Central Processing Unit (CPU), main memory.	4
4	Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.	3
5	Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).	5
6	Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.	5
7	Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.	5
8	Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.	5

9	Introduction of Operating System: introduction, operating system concepts, types of operating system.	4
10	Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.	5
11	Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.	4
12	Application of Computers in clinical settings.	1
Total		45 hrs

Text books:

- (1) Mausner&bahn : Epidemiology-An Introductory text, 2nd Ed.,W.B.Saunders Co.
- (2) Richard f. Morton & j. Richard hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- (3) Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Biostatistics and Research Methodology
Course Code	AEC 004 L

Teaching Objective	<ul style="list-style-type: none"> • To enable students to present, analyze and interpret data. • To enable students to use concepts of probability in business situations. • To enable students to make inferences from samples drawn from large datasets. • To enable students to apply univariate and multivariate statistical techniques.
Learning Outcomes	<ul style="list-style-type: none"> • To understand the importance & Methodology for research • To learn in detail about sampling, probability and sampling distribution, significance tests correlation and regression, sample size determination, study design and multivariate analysis.

Sr. No.	Topics	No. of Hrs.
1	Introduction to research methods	5
2	Identifying research problem	5
3	Ethical issues in research	5
4	Research design	5
5	Basic Concepts of Biostatistics	5
6	Types of Data	5
7	Research tools and Data collection methods	5
8	Sampling methods	5
9	Developing a research proposal	5
Total		45 hrs

Text books:

- (1) Mausner & Bahn : Epidemiology-An Introductory text, 2nd Ed., W.B.Saunders Co.
- (2) Richard f. Morton & j. Richard Hebd : A study guide to Epidemiology and Biostatistics, 2nd Ed., University Park Press, Baltimore.
- (3) Sylvia W Smoller, J Smoller, Biostatistics & Epidemiology A Primer for health and Biomedical professionals, 4th edition, Springs, 2015

THIRD YEAR

(B.Sc. Medical Dialysis Technology)

SEMESTER-V

Code No.	Core Subjects
Theory	
BMDT 120 L	Applied Dialysis Technology – I
BMDT 121 L	Advance Dialysis Technology – I
BMDT 122 CP	MDT Directed Clinical Education - III
Practical	
BMDT 120 P	Applied Dialysis Technology: – I
BMDT 121 P	Advance Dialysis Technology – 1
Core Elective Course	
CEC 005 L	Basics of Clinical Skills Learning
CEC 006 L	Hospital Operation Management

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Applied Dialysis Technology – I
Course Code	BMDT 120 L

Teaching Objective	<ul style="list-style-type: none"> • Students explain history of Dialysis and nephrology. • Students understanding of the underlying anatomy and physiology on which peritoneal dialysis is based. • Understands and demonstrate the Physiology of Dialysis • Describes, procedure of Venipuncture and demonstrate it • Able to maintain Records and Reports and demonstrate the procedure.
Learning Outcomes	<ul style="list-style-type: none"> • Know the History • Describes the anatomy and Physiology • Performs Physiological principles of Dialysis • Demonstrated Procedures as Venepuncture, Cannulisation and maintenance of Sterilization of Equipment's and Dialysis Unit • Demonstrate maintenance of Records and Reports .

Sr. No.	Topics	No. of Hrs.
1	History of Dialysis –Indian History of dialysis History of Nephrology : Acute Kidney Injury, Renal angiogram , Biopsy and Transplant Anatomy & Physiology of dialysis: Peritoneal Anatomy (Basic), The peritoneal membrane as a “dialyzer.”, The three-pore model. Peritoneal Physiology, Diffusion Ultra diffusion , Absorption, Clinical Assessment	10
2	Principles of Dialysis, quantification of adequacy: Principles of diffusion, filtration, ultrafiltration, convection, and osmosis. Solute transport and fluid movement during dialysis. Principles of fluid dynamics. Hemodialysis& Peritoneal Dialysis. Measuring dialysis adequately: Urea reduction ratio - Urea Kinetic Modeling. Pre –dialysis and post dialysis - BUN Measurement. Measurement of KT/V	08
3	Vascular Access – Temporary & Permanent: Types of vascular access – Fistulae, Grafts, Catheters. Pre- dialysis assessments for all types of vascular access. Methods of needle insertion for AVFs and grafts. Pre - dialysis assessment, accessing procedure,	08

	exit site care, and monitoring of catheters	
4	Types of Dialysis: Genesis of dialysis, invention and the process involved in the evolution of dialysis, indication of dialysis. Types of dialysis and classification. Dialysis for acute kidney injury, dialysis for chronic kidney disease. Introduction to Continuous renal replacement therapy (CRRT).	14
5	Equipment, Accessories & Function (hemodialysis machine, peritoneal dialysis machine): Types of equipment used in the dialysis process. Parts of a dialysis machine, tubing's and the water supply for dialysis. Overview of the various equipment ,accessories and working of a dialysis machine-The technology, functioning, calibration, and sterilization of dialysis machine according to their: Type/ brand, Frequency and duration of use, Importance of Calibration and Sterilization , Recording (Calibration, Sterilization and set up details),Planning and Organizing Scheduled Maintenance, Various indicators, alarms and sensors of the dialysis machine. corrective steps to be taken when a particular alarm goes off	12
6	Infection control and sterilization: Morphology of microorganisms, Sterilization and Disinfection, Microbiology of vascular access infection (femoral, jugular, subclavian catheters), Sampling methodologies for culture & sensitivity, Principles and Practice of Biomedical waste management	05
7	Renal data maintenance: Records and reports maintained in the dialysis unit. Need for maintenance of records and report. The technologist's responsibility in maintenance of records and report. Medico legal aspects of maintenance of records	03
Total		60hrs

BMDT 120 P Applied Dialysis Technology – I

Sr. No.	Topics	No. of Hrs.
1	A.V. Cannulation	15
2	A.V. Fistula	15
3	Initiation of dialysis through central venous catheters – Internal Jugular – Femoral – Subclavian vein Packing and sterilization of dialysis trays	15
4	Termination Dialysis	15
Total		60hrs

Recommended Text Books:

1. Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
2. Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
3. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
4. Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
5. Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley &Belfus.
6. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
7. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
8. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

Reference books or related websites: www.osmosis.org

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Advance Dialysis Technology - I
Course Code	BMDT 121 L

Teaching Objective	<ul style="list-style-type: none"> • Students Learn about Types of Dialysis and its Implications • Comprehend the various modalities of renal replacement therapy with the knowledge of merits and demerits of each • Differentiate between peritoneal dialysis, SLED, CRRT, High efficiency dialysis & Hemodialysis in terms of purpose, indications, advantages, disadvantages and the responsibilities of a technologist.
Learning Outcomes	<ul style="list-style-type: none"> • Practice and perform independently the water maintenance for the Hemodialysis room • Independently maintain the Hemodialysis machine with respect to disinfection and priming.

Sr. No.	Topics	No. of Hrs.
1	Hemodialysis <ul style="list-style-type: none"> • The process of Haemodialysis, vascular access. • Starting Haemodialysis, priming of the dialyser, alarms and the settings of a dialyser, completion of Haemodialysis, closing the Haemodialysis. • Cleaning of the tubing's and dialyser and the dialysis machine. • Complications of Haemodialysis– Acute & chronic Complications of Haemodialysis, • acute complications – monitoring, prevention for acute complications. • Chronic complications – list, prevention strategies, monitoring for chronic complications 	16
2	Preparation and positioning of patient for dialysis, Patient Assessment – Pre, intra & post dialysis & Machine and patient monitoring during Hemodialysis: <ul style="list-style-type: none"> • Introduction to patient assessment, Understanding a treatment plan, • Equipment preparation – Dialysate - Dialyser and Blood lines, Decisions 	8

	<p>regarding the appropriate size and type of catheter/ IV tubing to be used</p> <ul style="list-style-type: none"> • Connecting patients to the machine- Initiation of dialysis - Removing fluid - Replacing fluid - Drawing blood samples - Testing blood samples. • Measuring dialysis adequately: Urea reduction ratio - Urea Kinetic Modelling. Pre –dialysis and post dialysis - BUN Measurement. • Factors affecting dialysis treatment, communicating and documenting the findings prior to the dialysis process. • Starting the dialysis treatment: Monitoring during dialysis - Patient Monitoring (blood pressure, temperature, rate of blood flow, proper mixture of dialysate, presence of air bubbles)- Technical Monitoring. • Importance of reporting, HD Complications during dialysis: Clinical complications - Technical Complications- Procedure to disconnect the patient - procedure for removing the IV canula- • Post dialysis procedures, Post dialysis patient evaluation, Recording of the Treatment, Recording changes in Patient’s condition, • Preparation of status and progress reports, Equipment clean up and Maintenance, Recording the dialysis procedure on the medical report/chart of the patient. 	
3	<ul style="list-style-type: none"> • Dialysate delivery system: Definition of a delivery system, types of delivery systems. • Composition of dialysate: Various dialysate compositions, its uses and indications. Method for obtaining various compositions of dialysate • High flux / high efficiency dialysis: Definition of high flux / high efficiency dialysis, differences between high flux dialysis and Haemodialysis, used and indications for high flux dialysis, complications of high flux dialysis, precautions and contraindications. Care during a high flux dialysis. 	8
4	<p>Peritoneal Dialysis: Acute and Chronic Peritoneal Dialysis.</p> <ul style="list-style-type: none"> • PD – Transport kinetics, ultrafiltration, UF, Intermittent PD, Continuous Ambulatory Peritoneal Dialysis, Automated Peritoneal Dialysis, Dialysis 	8

	<p>Solutions, Novel uses of PD. Adequacy of peritoneal dialysis chronic peritoneal Dialysis - KT/V Creatinine clearance. PET - Peritoneal Equilibrium test and interpretation.</p> <ul style="list-style-type: none"> • Infectious and non infectious complications of PD Introduction to complications in peritoneal dialysis. • List of Complications: Catheter Infections Peritonitis Inadequate flow or drainage of the dialysis fluid Lesions Ultra filtration failure. • Management of exit site infection, Early Exit Site Care. • Chronic Care of the Healed Exit Site Diagnosing Exit Site Infections Treatment of exit-site infections Technique to culture exit site infection Medical management of CAPD peritonitis Initiation of therapy based on gram stain results Antibiotic selection 	
5	<p>Medications in dialysis, Nutrition management in dialysis patients:</p> <ul style="list-style-type: none"> • Common drugs used for a patient on dialysis. • Use of antibiotics during and post dialysis, considerations to be taken. • Erythropoietin use in patients on dialysis - dosage and administration. • Antihypertensive use - considerations during dialysis. • Vaccines for patients on haemodialysis - need and the schedule. • Introduction to nutrition and RDA's. Renal diet. • Teaching for a patient on renal diet. • Diet & method of cooking to be employed. • Planning a renal diet for a patient with CRF 	12
6	<p>Anticoagulation:</p> <ul style="list-style-type: none"> • Use of anticoagulation in the dialysis setting, various anticoagulants used in dialysis. • Monitoring during use of anticoagulants. • Method of administration. • Calculation of anticoagulant use & complications. • Heparin free dialysis - need and indication. Regional citrate anticoagulation 	8
Total		60 hrs

BMDT 121 P Advance Dialysis Technology –I

Sr. No.	Topics	No. of Hrs.
1	Setting up a dialysis machine for dialysis	10
2	Preparation of concentrates – depending on the situation	10
3	Reuse of dialysis apparatus	10
4	Isolated ultrafiltration.	10
5	Performance of peritoneal dialysis exchange – manually	10
6	Setting up of automated peritoneal dialysis equipment	10
Total		60 hrs

Recommended Text Books:

1. Davison A.M., (2010) Oxford textbook of Nephrology Volume 4 Oxford University Press.
2. Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
3. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
4. Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
5. Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
6. Khanna,R., Krediet R.T.,(2009) Nolph and Gokal's Textbook of Peritoneal Dialysis, 3rd Ed Springer. Feehally J., Floege, J., Johnson R.J., (2007) Comprehensive Clinical Nephrology 3rd Ed Mosby

Reference books or related websites: www.123sonography.com

Course code- BMDT 122 CP: MDT Directed Clinical Education – III

Students will gain additional skills in interventional procedures, cardiac pharmacology and recent advancements. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate pharmacological and invasive techniques.

(Total- 360 hrs)

CORE ELECTIVE COURSES

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Basics of Clinical Skill Learning
Course Code	CEC 005 L

Teaching Objective	<ul style="list-style-type: none"> •To Understand the basic ideas on how to check for Vital Signs of the Patient • This course the Student will learn how to handle the patients and their positioning •They will also learn on the Basics of Nasal-Gastric Tube •The Students will learn on Administration of IV, IV and Medication •Also they will know about Cleanliness in the Asepsis
Learning Outcomes	<ul style="list-style-type: none"> •After successful accomplishment of the course, the students would be able to Measure Vital Signs, do basic physical Examination of the patients, NG tube basics, Administration of Medicines •The students will learn about Asepsis, and the Cleanliness related to asepsis and on mobility of the patients

Sr. No.	Topics	No. of Hrs.
1	MEASURING VITAL SIGNS: Temperature: Axillaries Temperature, Pulse: Sites of pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale	5
2	PHYSICAL EXAMINATION: Observation, Auscultation (Chest), Palpation, Percussion, History Taking	10
3	FEEDING: ENTRAL FEEDING, NG TUBE: Measurement, Procedure, Care, Removal of Nasal-Gastric Tube, Nasal-Gastric Tube Feeding, and Parenteral Nutrition.	10
4	ADMINISTRATIONS: Oral, Intravenous, Intramuscular, Subcutaneous, Recapping of Syringe, Loading of Drugs, Calculation of Drugs, Venipuncture, IV Infusion, Cannula, Attachment of IV infusion Set, Fluid Collection, Heparin Lock, Maintenance of IV set, Performing Nebulizer Therapy, Inhaler, Oxygen Therapy (Nasal, prongs, nasal Catheter, Venturi Mask, face mask)	10
5	ASEPSIS: Hand wash Techniques, (Medical, Surgical) Universal Precaution, Protecting Equipment's: Using Sterile Gloves, Opening a Sterile package and Establishing a Sterile Field, Sterile Dressing Changes, Surgical Attire, Wound Dressing, Suture Removal, Cleaning and Application of Sterile Dressing, Wearing and Removal of personal protective Equipment	5
6	MOBILITY AND SUPPORT: Moving and Positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints	5
Total		45 hrs

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Hospital Operation Management
Course Code	CEC 006 L

Teaching Objective	<ul style="list-style-type: none"> •To promote scientific management of hospital and advancement of health care systems so as to make it rational, responsive and cost efficient •To promote the development of high quality of hospital care in the community and the country. •It has to provide a satisfactory environment to the patient and also to the doctors for clinical research.
Learning Outcomes	<ul style="list-style-type: none"> •Understand and apply resource management concepts (personnel, finance, and material resources) and the processes and strategies needed in specific hospital sectors •Communicate effectively and develop their leadership and teambuilding abilities •Apply modern change management and innovation management concepts to optimize structures •Analyze existing hospital service policies and enhance their alignment within the local and national context

Sr. No.	Topics	No. of Hrs.
1	MEDICO-LEGAL CASES: Introduction: Laws associated with Medico-Legal Cases, Three Core Contents in Medico-legal cases w.r.t Doctors, Patient & Profession,	5
2	CONSIDERATIONS OF ETHICS: Consent, Confidentiality, Mental Health, End of life and Organ Transportation, Research & Clinical Trials	10
3	HOSPITAL INFORMATION SYSTEM(HIS): Hospital Information System Management, software applications in registration, billing, investigations, reporting, medical records management, Security and ethical challenges	10
4	EQUIPMENT OPERATIONS MANAGEMENT: Hospital equipment repair and maintenance, types of maintenance, job orders, equipment maintenance log books, AMCS	10
5	ROLE OF MEDICAL RECORDS IN HEALTH CARE MANAGEMENT: Computers for Medical records, Developments of computerized medical record information processing system (EMR's), Computer stored (Vs) Manual hand written record, Advantages of EMR (Vs) Manual	10
Total		45hrs

THIRD YEAR
(B.Sc. Medical Dialysis Technology)

SEMESTER-VI

Code No.	Core Subjects
Theory	
BMDT 123 L	Applied Dialysis Technology II
BMDT 124 L	Advance Dialysis Technology II
BMDT 125 CP	MDT Directed Clinical Education-IV
Practical	
BMDT 122 P	Applied Dialysis Technology II
BMDT 123 P	Advance Dialysis Technology II

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Applied Dialysis Technology - II
Course Code	BMDT 123 L

Teaching Objective	<ul style="list-style-type: none"> • Enumerate on the various complications of Hemodialysis in terms of the technologist's responsibility in prevention and worsening of the complications • Dialysis in special Cases • Students learns about various conditions and their association in Dialysis • Student demonstrated Skills in Follow up care and quality maintenance in terms of renal dialysis treatment Modalities and Procedures
Learning Outcomes	<ul style="list-style-type: none"> • Train patients in performing peritoneal dialysis, and personal care. • Practice personal safety & standard precautions. • Handling complications during dialysis procedures. • Maintain quality and safety

Sr. No.	Topics	No. of Hrs.
1	<p>Acute and chronic dialysis prescription/ consideration: Common drugs for patients with ARF & CRF, Actions, side effects</p> <p>Special considerations: Patients with Renal anemia, Congestive cardiac failure (CCF), advance liver disease, Positive with HIV, HBSAG & HCV. Failed Transplant, Poisoning cases & pregnancy.</p>	10
2	<p>Dialysis in Neonates, infants, children & adolescence: Dialysis for infants and neonates, vascular access in this special group, dialysis settings, Monitoring for complications and management of complications. Role of technician in nosocomial infection & infection control.</p>	06
3	<p>Special Problems in dialysis patients: Cardiovascular diseases, Diabetes, Hypertension, Infections (HBV, HCV, HIV), Bone diseases, Aluminum toxicity. Role of technician in nosocomial infection & infection control.</p>	04
4	<p>Psychosocial aspects & patient education Psychological impact of a chronic disease: Psychology of patient with disease prognosis, the financial implications of the</p>	10

	disease, the family and its role in the care of the patient with CRF. Patient education on diet, prevention of complications, drug compliance. Rehabilitation for acute and chronic CKD or dialysis patients	
5	Instruct patients about in-home treatment and precaution: Identification of the type of patient for whom in house treatment is possible and in line with doctor's advice, procedure of in-house treatment options, pros and cons of in-house treatment options, the relevant protocol and procedures to be followed to carry out the process	10
6	General principle of hospital: practice Hospital structure and organization, Care of Patient , Basic Assessment Skills, First aid & Basic Life Support, Maintenance of Hygiene & Infection Control Practices, Principles of asepsis, Maintenance of Medications in the department, Specialized Investigations - Care of Patients, Medico - Legal Issues	10
7	Quality assurance in dialysis: Standards of practice, Various risks to quality and safety, JCI recommendations, NABH recommendations. Infection control policies and procedures in the dialysis unit.	10
Total		60hrs

BMDT 123 P Applied Dialysis Technology - II

Sr. No.	Topics	No. of Hrs.
1	Dialysis Unit priming (Setting)	15
2	A.V. Cannulation & Termination	15
3	A.V. Fistula / A.V. Grafting	15
4	Dialysis catheterization (Internal Jugular – Femoral – Subclavian vein Packing) including sterilization.	15
Total		60hrs

Recommended Text

1. Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
2. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
3. Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
4. Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
5. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
6. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

Name of the Programme	B.Sc. Medical Dialysis Technology
Name of the Course	Advance Dialysis Technology II
Course Code	BMDT 124 L

Teaching Objective	<ul style="list-style-type: none"> • Students learns about Advancements in Dialysis • Practice independently SLED, CRRT and high efficiency dialysis • Learns different Advanced Renal therapies
Learning Outcomes	<ul style="list-style-type: none"> • Demonstrate Knowledge about Advancements in Renal Dialysis and in renal therapies • Demonstrate peritoneal dialysis, and its self care • Involves family centered approach while providing patient care • Handling complications during dialysis procedures.

Sr. No.	Topics	No. of Hrs.
1	New generation dialysis: Recent advances in hemodialysis, Nocturnal dialysis, online dialysis, Daily dialysis, Telemedicine in dialysis practices	10
2	Water treatment-pretreatment, deionizer, Reverse Osmosis: Purpose of water treatment for dialysis. Components of a dialysis Centre's water treatment system. Advantages and disadvantages of water softeners, carbon tanks, reverse osmosis, deionization, and ultraviolet irradiation in the treatment of water for dialysis. Monitoring of water treatment systems – disinfection, microbiological testing, water sampling and chemical monitoring. Method for microbiological testing of the water treatment system. Typical water treatment monitoring schedule, reverse osmosis process and system: definition of RO, cartridge pre-filter, reverse osmosis pump and monitor assembly, RO membranes, Quality assessment mechanisms, JCI requirements, ISO requirements, checklists and tools used for optimal compliance	15
3	Dialysis reuse: History of dialyzer reprocessing. Reason for dialysis reprocessing. Steps involved in dialyzer reprocessing. Hazards of dialyzer reprocessing. Documentation for dialyzer reprocessing.	10

4	Dialyzer Membranes: Introduction to dialyzer membranes. Composition of the dialyzer membranes, types its use and sizes of the various membranes. Principles on which the dialyzer membranes work	10
5	Renal Therapies (continuous): Definition, indications, uses, method of initiation of dialysis, contraindications of therapy. Complications of therapy and ways to prevent complications. Monitoring during MARS dialysis, SLED and CRRT. Technologist's roles and responsibilities during MARS dialysis CRRT & SLED. Continuous therapies in hemodialysis, Hemoperfusion, Plasma Pheresis.	15
Total		60hrs

BMDT 124 P Advance Dialysis Technology - II

Sr. No.	Topics	No. of Hrs.
1	Dialysis Reuse	15
2	First assistant in minor procedures	15
3	CPR Demonstrations	15
4	Prepare Presentations based on various kinds of data collection	15
Total		60hrs

Recommended Text Books:

1. Water quality in hemodialysis by E.Bonnie-Schorn, A, Grassmann, I. Uhlenbusch-Korwer, C.Weber, J.Vienken
2. Brenner B.M., et al. (2011) Brenner and Rector's The Kidney 9th Ed, Elsevier Health Sciences
3. Schrier R.W., (2006) Diseases of the Kidney and the urinary tract (Vol I, II, & III) 8th Ed, Lippincott Williams & Wilkins.
4. Claude Jacobs (1996) Replacement of Renal Function by Dialysis Springer.
5. Nissenson, A. R., Fine R.N., (2002) Textbook of Dialysis therapy 3rd Ed Hanley & Belfus.
6. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
7. Orientation to National Kidney Foundation Hemodialysis Program – Training Manual by Gay Martin.
8. Dialysis Technology – A Manual for Dialysis Technicians by Jim Curtis, Philip Varughese.

Course code- BMDT 125 CP: MDT Directed Clinical Education – IV

Students will gain additional skills in diagnosis in pediatric cases and pediatric interventional procedures. Students apply knowledge from previous clinical learning experience under the supervision of a senior technologist. Students are tested on intermediate clinical diagnostic and therapeutic skills.
(Total – 450 hrs)

INTERNSHIP

Guidelines:

1. The internship shall commence after the student has completed and passed all subjects up to VI semesters.
2. The internship is compulsory.
3. The duration of the internship shall be one year.
4. The degree of Bachelor in Allied Health Sciences shall be awarded after the satisfactory completion of the internship.

Evaluation of Internees:

Formative Evaluation:

Day to day assessment of the internees during their internship postings should be done by the Head of the Department/Faculty assigned. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This can be achieved by maintaining Records /Log Book by all internees. This will not only provide a demonstrable evidence of the processes of training but more importantly of the internee's own acquisition of competence as related to performance.

Summative Evaluation:

It shall be based on the observation of the Sr. Technical staff / Faculty of the department concerned and Record / Log book maintained by the interns. Based on these two evaluations, the Head of the Department shall issue certificate of satisfactory completion of training, following which the university shall award the degree or declare him/her eligible for it.

To implement the project work uniformly for all the specialties in view of the curriculum and training to be acceptable internationally and the students to get opportunity for higher studies and employment.

Internship Programme:

05 days for orientation programme

120 days in Dialysis Unit

30 days in Nephrology Ward

60 days in Nephrology OT

30 days for Nephrology OPD

Checklist - I

Continuous Evaluation of Directed Clinical Education (Clinical Posting) by Faculty in charge
Name of the student: _____ **Date:** _____

Semester: _____ **Name of the faculty/Observer:** _____

Core Competencies	Grade
Students will begin to develop critical thinking abilities utilizing the allied health personnel roles of communicator and caregiver. Students will learn principles of professional allied health personnel practice and provide direct care to individuals within a medical surgical setting while recognizing the diverse uniqueness of individuals with health alterations.	Write a grade 1-4 in the boxes below
I. Clinical Teaching	
a. Demonstrate beginning competency in technical skills.	
II. Independent Work by Student guided by faculty	
a. Develop effective communication skills (verbally and through charting) with patients, team members, and family	
b. Identify relevant data for communication in pre and post conferences	
c. Identify intra and inter-professional team member roles and scopes of practice. Establish appropriate relationships with team members.	
d. Identify need for help when appropriate to situation. Delegates level specific skills to appropriate team member.	
III. Hands on practical work by students	
a. Navigate and document clear and concise responses to care in the electronic health record for patient, where appropriate for clinical setting	
b. Protect confidentiality of electronic health records data, information, and knowledge of technology in an ethical manner	
IV. Independent work by student	
a. Maintain a positive attitude and interact with inter-professional team members, faculty, and fellow students in a positive, professional manner. Accept constructive feedback and develop plan of action for improvement.	
b. Demonstrate expected behaviours and complete tasks in a timely manner. Arrive to clinical experiences at assigned times. Maintain professional behaviour and appearance.	
c. Accept individual responsibility and accountability for nursing interventions, outcomes, and other actions. Engage in self evaluation & assumes responsibility for learning.	

***Clinical evaluation tool guidelines for full descriptions of grades 1-4.**

4-exceeds expectations (range of marks –40-50 marks)

3-meets expectations (range of marks –30-40 marks)

2-below expectations (range of marks –25-30 marks)

1-does not meet expectations (range of marks –no marks)

Resolution No. 4.5.1 of BOM-53/2018:

It was accepted to keep 50% as the passing marks for all the elective and core subjects for UG courses under School of Biomedical Sciences.

Resolution No. 4.13 of BOM-55/2018: Resolved as follows:-

- (i) Slow learners must be re-designated as potential learners.
- (ii) Students scoring less than 35% marks in a particular subjects/course in the 1st formative exam are to be listed as potential learners. These learners must be constantly encouraged to perform better with the help of various remedial measures.
- (iii) Students scoring more than 75% marks in a particular subjects/course in the 1st formative exam are to be listed as advanced learners. These learners must be constantly encouraged to participate in various scholarly activities.

Resolution No. 3.1.4.2 of BOM-57/2019:

- i.** Resolved to include “Gender Sensitization” into UG (from new batch 2019-2020) and PG (from existing batches) curricula. [**Annexure-21**]
- ii.** Resolved to align the module of “Gender Sensitization” with MCI CBME pattern for MBBS students.
- iii.** Resolved that Dr. Swati Shiradkar, Prof., Dept. of OBGY., MGM Medical College, Aurangabad will coordinate this activity at both campuses.

Annexure - 21

Gender sensitization for UG (2nd , 3rd , 8th semesters) and PG (3 hours)

INCLUSION OF “ GENDER SENSATIZATION” IN CURRICULUM

Introduction :

The health care provider should have a healthy gender attitude, so that discrimination, stigmatization, bias while providing health care will be avoided. The health care provider should also be aware of certain medico legal issues related with sex & gender.

Society particularly youth & adolescents need medically accurate, culturally & agewise appropriate knowledge about sex, gender & sexuality. So we can train the trainers for the same. It is need of the hour to prevent sexual harassment & abuse .

To fulfill these objectives, some suggestions are there for approval of BOS.

Outline

- 1)For undergraduates :- Three sessions of two hours each, one in 2nd term, one in 3rd term & one in 8th term.
- 2)For Faculties and postgraduates :- One session of two hrs .
- 3)For those want to be trainers or interested for their ownself, value added course, which is optional about sex, gender, sexuality & related issues.

Responsibility

ICC of MGM, MCHA , with necessary support from IQAC & respective departments.

Details of undergraduate sessions

1)First session in 2nd term

Aim – To make Students aware about the concept of sexuality & gender.

To check accuracy of knowledge they have,

To make them comfortable with their own gender identify & related issues.

To make them aware about ICC & it is functioning.

Mode – Brain storming , Interactive power point presentation experience sharing.

Duration – Around two hours

Evaluation – Feedback from participants.

2)Second session in 3rd / 4th term

Aim – To ensure healthy gender attitude in these students as now they start interacting with patients.

To ensure that the maintain dignity privacy while interacting with patients and relatives, particularly gender related.

To make them aware about importance of confidentiality related with gender issues.

To encourage them to note gender related issues affecting health care & seek solutions.

Mode – focused group discussions on case studies, Role plays & discussion.

--3--

Duration – Around two hours.

Evaluation – Feedback from participants.

Third session in 8th term.

Aim – To understand effect of gender attitudes on health care in various subjects.

To develop healthy gender attitude while dealing with these issues.

Mode – Suggested PBL by departments individually. (In collaboration with ICC till faculty sensitization is complete)

Evaluation – Feedback

FOR POSTGRADUATES

Session of 2-3 hrs preferably in induction program.

Aim – To introduce medically accurate concept of gender, sex, gender role & sex role.

To ensure healthy gender attitude at workplace.

To understand gender associated concepts on health related issues & avoid such bias while providing health care.

To make them aware about ICC & its functioning.

Mode – Interactive PPT

Role plays & discussion

Duration – 2 to 3 hrs

Evaluation – Feedback.

FOR FACULTIES

Session of 2 hours may be during combined activities.

Aim – To ensure clarity of concept about gender & sex.

To discuss effect of these concepts on health-related issues.

To identify such gender & sex-related issues in individual subject specialties.

To discuss methodology like PBL for undergraduate students when they are in 7th-8th semester.

Mode – Role play

 Focused group discussion

 Case studies

Evaluation – Feedback.

Sdp-Pimple/joshi-obgy

Resolution No.3.2.3.8 of BOM-59/2019: Resolved to approve the list of books for B.Sc. Allied program for subject Microbiology. [Annexure-24]

Department of Microbiology

List of Books for BSc- Allied Sciences (Annexure I)

1st Year BSc

1. Textbook of Microbiology for Nurses by Ananthnarayan & Paniker- 2nd Edition, University Press
ISBN 978-81-7371-997-4
2. Practical & Applied Microbiology by Anuradha De- 5th Edition, National Publication, ISBN 978-93-80206-35-6

2nd & 3rd Year BSc

1. Microbiology for MLT Students by Arora , 2018, ISBN 9789386827579
2. Textbook of Medical Microbiology and Parasitology by Praful Godkar ISBN 9789381496336
3. Practical & Applied Microbiology by Anuradha De- 5th Edition, National Publication, ISBN 978-93-80206-35-6

Dr. S. Samant

Member, BOS (Biomedical sciences)

Co-ordinator, MSc Medical courses

Dr. A. D. Urhekar
Professor & HOD
Dept. of Microbiology

Resolution No.3.2.3.8 of BOM-59/2019: Resolved to approve the list of books for B.Sc. Allied program for subject Microbiology. [Annexure-24]

Department of Microbiology

List of Books for BSc- Allied Sciences (Annexure I)

1st Year BSc

1. Textbook of Microbiology for Nurses by Ananthnarayan & Paniker- 2nd Edition, University Press
ISBN 978-81-7371-997-4
2. Practical & Applied Microbiology by Anuradha De- 5th Edition, National Publication, ISBN 978-93-80206-35-6

2nd & 3rd Year BSc

1. Microbiology for MLT Students by Arora , 2018, ISBN 9789386827579
2. Textbook of Medical Microbiology and Parasitology by Praful Godkar ISBN 9789381496336
3. Practical & Applied Microbiology by Anuradha De- 5th Edition, National Publication, ISBN 978-93-80206-35-6

Dr. S. Samant

Member, BOS (Biomedical sciences)

Co-ordinator, MSc Medical courses

Dr. A. D. Urhekar
Professor & HOD
Dept. of Microbiology

Resolution No. 4.3.1.2 of BOM-63/2021: Resolved to include topics related to COVID 19 in UG {B.Sc. AT & OT (BOTAT 108L), B.Sc. MLT(BMLT 108 L), B.Sc. MRIT (BMRIT 108L), B.Sc. MDT-(BMDT 108L), B.Sc. CCT (BCCT 108L), B.Sc.PT (BPT 108L), B.Optomety (BOPTOM 108L) Programs for Batch AY 2020-21 (Semester II)} & B.Sc. Medical Laboratory Technology SEMESTER-VI in subject of Medical Microbiology-II (BMLT 125 L) & Medical Microbiology-II (BMLT 125 P) for Batch AY 2020-21. **[Annexure-7]**
Further Dr. N.N. Kadam, Hon'ble Pro Vice Chancellor suggested to add topics under "Newer Infectious Diseases" as the main topic.

Annexure-07 of BOM-63/2021 dt 17.02.2021

To include Covid-19 topics in health professional curriculum as per the BOM Resolution No. 3.7 of BOM-62/2020

- a) **B.Sc. Allied (in 2nd semester) common for all UG Programs (B.Sc. AT&OT, B.Sc. MLT, B.Sc. MRIT, B.Sc. MDT, B.Sc. CCT, B.Sc. PT, B.Optomety):**

Approved syllabus	Name of the subject	Existing content	Proposed changes
Common Syllabus for First year B.Sc. Allied Health Sciences - (B.Sc. AT&OT, B.Sc. MLT, B.Sc. MRIT, B.Sc. MDT, B.Sc. CCT, B.Sc. PT, B.Optomety) (Sem 2)	General Microbiology (BOPTOM 108L BOTAT 108L BMLT 108 L BMDT 108L BMRIT 108L BPT 108L BCCT 108L)	Sr. no. 8 Virology - Common Viral infection of eye, Introduction, General Properties, outline of lab diagnosis& Classification, HIV Virus, Hepatitis -B Virus.	Sr. no. 8 Introduction to Virology- Common Viral infection of eye, Introduction, General Properties, outline of lab diagnosis& Classification, HIV Virus, Hepatitis -B Virus, COVID 19- Morphology, Mode of Transmission, Collection and Transport of Specimens, Different Diagnostic Tests, Precautions to be taken by HCW,

Resolution No. 4.3.1.3 of BOM-63/2021: Accorded post facto approval for changes in the index of UG (B.Sc. AT & OT, B.Sc. MLT, B.Sc. MRIT, B.Sc. MDT, B.Sc. CCT, B.Sc.PT, B. Optometry) and PG 2 year (M.Sc. Medical Biotechnology, M.Sc. Medical Genetics, M.Sc. Biostatistics, M.Sc. Molecular Biology, M.Sc. MRIT, M.Sc. CCT, M.Sc. Clinical Nutrition, M.Sc. Clinical Embryology, Master in Hospital Administration, Master of Public Health, and M.Optomety). [Annexure-8A, 8B]

OUTLINE OF COURSE CURRICULUM												
B.Sc. Medical Dialysis Technology												
Semester I												
Code No.	Core Subjects	Credits/Week				Hrs/Semester				Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total
Theory												
BMDT 101 L	Human Anatomy Part I	3	-	-	3	45	-	-	45	20	80 (UEX)	100
BMDT 102 L	Human Physiology Part I	3	-	-	3	45	-	-	45	20	80 (UEX)	100
BMDT 103 L	General Biochemistry Nutrition	3	1	-	4	45	15	-	60	20	80 (UEX)	100
BMDT 104 L	Introduction to National Health Care System (Multidisciplinary/ Interdisciplinary)	3	-	-	3	45	-	-	45	20	80 (UEX)	100
Practical												
BMDT 101 P	Human Anatomy Part I	-	-	4		-	-	60	60	-	-	-
BMDT 102 P	Human Physiology Part I	-	-	4		-	-	60	60	-	-	-
BMDT 103 P	General Biochemistry	-	-	4		-	-	60	60	-	-	-
BMDT 105 P	Community Orientation & Clinical Visit (Including related practicals to the Parent course)	-	-	8		-	-	120	120	-	-	-
Ability Enhancement Elective Course												
AEC 001 L	English & Communication Skills	3	-	-	3	45	-	-	45	-	100 (INT)	100
AEC 002 L	Envioronmental Sciences											
Total		15	1	20	16	225	15	300	540	80	420	500

OUTLINE OF COURSE CURRICULUM												
B.Sc. Medical Dialysis Technology												
Semester II												
Code No.	Core Subjects	Credits/Week				Hrs/Semester				Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total
Theory												
BMDT 106 L	Human Anatomy Part II	2	-	-	2	30	-	-	30	10	40 (UEX)	50
BMDT 107 L	Human Physiology Part II	2	-	-	2	30	-	-	30	10	40 (UEX)	50
BMDT 108 L	General Microbiology	3	-	-	3	45	-	-	45	20	80 (UEX)	100
BMDT 109 L	Basic Pathology & Hematology	3	1	-	4	45	15	-	60	20	80 (UEX)	100
BMDT 110 L	Introduction to Quality and Patient safety (Multidisciplinary/Interdisciplinary)	3	-	-	3	45	-	-	45	20	80 (UEX)	100
Practical												
BMDT 106 P	Human Anatomy Part II	-	-	4	-	-	-	60	60	-	-	-
BMDT 107 P	Human Physiology Part II	-	-	2	-	-	-	30	30	-	-	-
BMDT 108 P	General Microbiology	-	-	4	-	-	-	60	60	-	-	-
BMDT 109 P	Basic Pathology & Hematology	-	-	4	-	-	-	60	60	-	-	-
BMDT 111 P	Community Orientation & Clinical Visit (Including related practicals to the parent course)	-	-	8	-	-	-	120	120	-	-	-
Skill Enhancement Elective Course												
SEC 001 L	Medical Bioethics & IPR	3	-	-	3	45	-	-	45	-	100 (INT)	100
SEC 002 L	Human Rights & Professional Values											
Total		16	1	22	17	240	15	330	585	80	420	500

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester III														
Code No.	Core Subjects	Credits/Week				Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total
Theory														
BMDT 112 L	Introduction To Dialysis	3	-	-	-	3	45	-	-	-	45	20	80 (UEX)	100
BMDT 113 L	Fundamentals of Dialysis	3	-	-	-	3	45	-	-	-	45	20	80 (UEX)	100
BMDT 114 L	Pharmacology in Dialysis	3	-	-	-	3	45	-	-	-	45	20	80 (UEX)	100
BMDT 115 CP	MDT Directed Clinical Education -I	-	-	-	24	8	-	-	-	360	360	-	50 (INT)	50
Practical														
BMDT 112 P	Introduction To Dialysis	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50
BMDT 113 P	Fundamentals of Dialysis	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50
Generic Elective Course														
GEC 001 L	Pursuit of Inner Self Excellence (POIS)	3	-	-	-	3	45	-	-	-	45	-	100 (INT)	100
GEC 002 L	Organisational Behaviour													
Total		12	0	8	24	24	180	0	120	360	660	80	470	550

OUTLINE OF COURSE CURRICULUM															
B.Sc. Medical Dialysis Technology															
Semester IV															
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total	
Theory															
BMDT 116 L	Concept of Renal Disease & Disorders	4	-	-	-	4	60	-	-	-	60	20	80 (UEX)	100	
BMDT 117 L	Nutrition in Dialysis	3	-	-	-	3	45	-	-	-	45	20	80 (UEX)	100	
BMDT 118 CP	MDT Directed Clinical Education -II	-	-	-	30	10	-	-	-	450	450	-	50 (INT)	50	
Practical															
BMDT 116 P	Concept of Renal Disease & Disorders	-	-	2	-	1	-	-	30	-	30	10	40 (UEX)	50	
BMDT 119 P	Seminar	-	-	-	-	1	-	-	-	-	-	-	50 (INT)	50	
Ability Enhancement Elective Course															
AEC 003 L	Computer and Applications	3	-	-	-	3	45	-	-	-	45	-	100(INT)	100	
AEC 004 L	Biostatistics and Research Methodology														
Total		10	0	2	30	22	150	0	30	450	630	50	400	450	

OUTLINE OF COURSE CURRICULUM															
B.Sc. Medical Dialysis Technology															
Semester V															
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks			
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total	
Theory															
BMDT 120 L	Applied Dialysis Technology: Part – I	4	-	-	-	4	60	-	-	-	60	20	80 (UEX)	100	
BMDT 121 L	Advance Dialysis Technology Part –1	4	-	-	-	4	60	-	-	-	60	20	80 (UEX)	100	
BMDT 122 CP	MDT Directed Clinical Education-III	-	-	-	24	8	-	-	-	360	360	-	50 (INT)	50	
Practical															
BMDT 120 P	Applied Dialysis Technology: Part – 1	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50	
BDT 121 P	Advance Dialysis Technology Part –1	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50	
Core Elective Course															
CEC 005 L	Basics of Clinical Skill Learning	3	-	-	-	3	45	-	-	-	45	-	100 (INT)	100	
CEC 006 L	Hospital Operation Management														
Total		11	0	8	24	23	165	0	120	360	645	60	390	450	

OUTLINE OF COURSE CURRICULUM														
B.Sc. Medical Dialysis Technology														
Semester VI														
Code No.	Core Subjects	Credits/Week					Hrs/Semester					Marks		
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total (hrs.)	Internal Assement (IA)	University semester Exam (UEX)/ Internal Semester Exam (INT)	Total
Theory														
BMDT 123 L	Applied Dialysis Technology - II	4	-	-	-	4	60	-	-	-	60	20	80 (UEX)	100
BMDT 124 L	Advance Dialysis Technology- II	4	-	-	-	4	60	-	-	-	60	20	80 (UEX)	100
BMDT 125 CP	MDT Directed Clinical Education -IV	-	-	-	30	10	-	-	-	450	450	-	50 (INT)	50
Practical														
BDT 123 P	Applied Dialysis Technology - II	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50
BDT 124 P	Advance Dialysis Technology - II	-	-	4	-	2	-	-	60	-	60	10	40 (UEX)	50
Total		8	0	8	30	22	120	0	120	450	690	60	290	350

OUTLINE OF COURSE CURRICULUM											
B.Sc. Medical Dialysis Technology											
Semester VII & Semester VIII											
Code No.	Core Subjects	Credits/Week					Hrs/Semester				
		Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total Credits (C)	Lecture (L)	Tutorial (T)	Practical (P)	Clinical Posing/Rotation (CP)	Total hrs.
	Sem VII (Internship)	-	-	-	720	16	-	-	-	720	720
	Sem VIII (Internship)				720	16				720	720
Total		0	0	0	1440	32	0	0	0	1440	1440