PROGRAM OUTCOME (POs)	
Course Code	**M.Sc. Medical Dialysis Technology**
PO1	Nurture the scientific and/or clinical knowledge and skills for development of health care practices, industrial/ community applications and entrepreneurship
PO2	Develop the ability of critical thinking to analyze, interpret problems in health care and to find out systematic approach for solution
PO3	Impart decision making capability for handling various circumstances in their respective areas
PO4	Demonstrate research skills for planning, designing, implementation and effective utilization of research findings for community.
PO5	Develop an ability to function as an efficient leader as well a team player in multidisciplinary sectors for effective outcomes demonstrating managerial skills
PO6	Demonstrate an effective written and oral communication skills to communicate effectively in health care sector, industries, academia and research.
PO7	Inculcate code of ethics in professional and social circumstances to execute them in daily practices and research in respective areas of specialization
PO8	Develop lifelong learning attitude and values for enhancement of professional and social skills for an overall development
PROGRAM SPECIFIC OUTCOME	
PSO 1	The primary goal of the Master of Science in Medical Dialysis Technology program is to prepare accomplished professionals in Dialysis Technology with a specific emphasis on clinical skills and technical knowledge along with professional research.
PSO 2	Students will acquire the research-based knowledge and procedural skills necessary to deliver a high standard of care to the patients with chronic kidney disease requiring renal replacement therapy.
PSO 3	This course involves all aspects of care for patients undergoing chronic hemodialysis.
PSO 4	Overall goal of this training is to foster the student's development into an independent care provider and researcher in the field of dialysis.
PSO 5	The program intends for its post graduates to contribute to a new generation of academic dialysis professional equipped to address the challenging problems in renal replacement therapy
COURSE OUTCOMES (COs)	
Course Code	**M.Sc. Medical Dialysis Technology**
SEMESTER I	
MMDT 101 T	**Anatomy (Nephroanatomy & Histology)**
CO1	Apply to clinical scenarios the concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology of urinary system
CO2	Students will be able to describe and analyze tissue types and organ structure & know the topics of fundamental anatomy and histology
CO3	Students will know and be able to describe the urinary system of the human body, will be able to describe their structure, location, will be able to explain the main regularities of functions.
MMDT 102 T	**Physiology (Nephrophysiology)**
CO1	To understand the functions of important physiological systems including the urinary systems.
CO2	Students will acquire knowledge on physiology related to Nephrology & Physiology applied to dialysis.
MMDT 103 T	**Nephrogenetics & Pharmacology**
CO1	This course gives a general knowledge and application part of the drugs or medicines used for renal problems
CO2	Knowledge of renal, cardio vascular, respiratory, Central Nervous System & corticosteroids to be able to manage renal patients under supervision of a nephrologists and assist a nephrologists

CC 001 T	**Research Methodology & Biostatistics (Core Core)**
CO1	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.
MMDT 104 P	**Anatomy (Nephroanatomy & Histology)**
CO1	Apply to clinical scenarios the concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology of urinary system
CO2	Students will be able to describe and analyze tissue types and organ structure & know the topics of fundamental anatomy and histology
CO3	Students will know and be able to describe the urinary system of the human body, will be able to describe their structure, location, will be able to explain the main regularities of functions.
MMDT 105 P	**Physiology (Nephrophysiology)**
CO1	To understand the functions of important physiological systems including the urinary systems.
CO2	Students will acquire knowledge on physiology related to Nephrology & Physiology applied to dialysis.
MMDT 106 CP	**MMDT Directed Clinical Education I**
CO 1	Build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.
CO 2	Emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students; confidence and competence in delivering quality patient care.
CO 3	Focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills—key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.
SEMESTER II	
MMDT 107 T	**Aetio-Pathology of Renal Disease**
CO1	The scope of this course is to provide overall information of the pathology, structural abnormalities and symptoms of kidney diseases.
CO2	To have knowledge of common medications used in dialysis, its administration & side effects
CO3	To know total patient care during dialysis & dietary management.
MMDT 108 T	**Clinical Nephrology**
CO1	The students are provided with adequate knowledge of patient assessment in renal diseases.
CO2	The students are trained to apply knowledge of laboratory & imaging investigations for diagnosing renal diseases.
MMDT 109 T	**Dialysis Equipment**
CO1	To understand the principle of working, construction, operation, uses, cleaning, handling, care, common trouble shooting, maintenance etc of the hemodialysis & peritoneal dialysis equipment
CO2	To conduct routine equipment management procedures including preventative maintenance, faultfinding, calibration and verifying of equipment prior to clinical use.
MMDT 110 T	**Water Treatment**
CO1	Different types of water source and methods of treatment employed by water supply companies
CO2	Ground sources and surface sources and the classification of contaminants
CO3	Potable water regulations

CO4	Necessity to treat potable water for use in dialysis.
CO5	Need for chemical limits
CO6	Evaluation of feed water quality, including hardness
CO7	Monitoring & disinfection of water treatment
MMDT 111 P	**Clinical Nephrology**
CO1	The students are provided with adequate knowledge of patient assessment in renal diseases.
CO2	The students are trained to apply knowledge of laboratory & imaging investigations for diagnosing renal diseases.
MMDT 112 P	**Dialysis Equipment**
CO1	To understand the principle of working, construction, operation, uses, cleaning, handling, care, common trouble shooting, maintenance etc of the hemodialysis & peritoneal dialysis equipment
CO2	To conduct routine equipment management procedures including preventative maintenance, faultfinding, calibration and verifying of equipment prior to clinical use.
MMDT 113 CP	**MMDT Directed Clinical Education II**
CO1	Build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.
CO2	Emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students; confidence and competence in delivering quality patient care.
CO3	Focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills—key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.
Skill Ehancement Course	
SEC 001 T	**Innovation and Entrepreneurship**
CO1	Students will grasp the concepts of innovation, its ecosystem, and the role of various stakeholders such as government policies, startups, and innovation hubs.
CO2	Cultivating an entrepreneurial mindset and leadership qualities necessary for driving innovation and leading ventures
CO3	Understanding the intersection of technology and innovation and leveraging emerging technologies for entrepreneurial ventures.
SEC 002 T	**One Health (NPTEL)**
CO1	A comprehensive understanding of One Health's role in global health challenges, emphasizing interconnectedness among human, animal, and environmental health.
CO2	Topics include research ethics, disease surveillance, and successes in controlling emerging infectious diseases.
CO3	Students explore disease emergence, transmission, antimicrobial resistance, and food safety, gaining insights into effective public health strategies.

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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CO PO Mapping

Programe - M.Sc. Medical Dialysis Technology

Semester I and II

PO1	Nurture the scientific and/or clinical knowledge and skills for development of industrial applications, health care practices and entrepreneurship.
PO2	Develop the ability of critical thinking to analyse, interpret problems and to find out systematic approach for solution.
PO3	Impart decision making capability for handling various circumstances in their respective areas
PO4	Demonstrate research skills for planning, designing, implementation and effective utilization of research findings for community.
PO5	Develop an ability to function as an efficientindividual and team player in multidisciplinary sectors for effective outcomes
PO6	Demonstrate an effective written and oral communication skills to communicate effectively in health care sector, industries,academia and research.
PO7	Inculcate code of ethics in professional and social circumstances to execute them in daily practices and research inrespective areas of specialization
PO8	Develop lifelong learning attitude and values for enhancementof professional and social skills for an overall development

PO Mapping same with correlation level 3,2,1 The notation of 1 - low, 2 - moderate , 3 - high

Semester	Course / Course Code	Course Outcome	Course Outcome	Knowledge and Skill	Critical Thinking & Problem Solving	Decision Making	Research Skill	Individual and Team Work	Communication Skills	Code of Ethics	Lifelong Learning	Average
				PO1	P02	PO3	PO4	PO5	PO6	PO7	PO8	
	Anatomy (Nephroanatomy & Histology) MMDT 101 T	CO1	Apply to clinical scenarios the concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology of urinary system	3	2	2	2	1	1	1	1	1.6
		CO2	Students will be able to describe and analyze tissue types and organ structure & know the topics of fundamental anatomy and histology	3	3	2	2	1	1	1	1	1.8
		CO3	Students will know and be able to describe the urinary system of the human body, will be able to describe their structure, location, will be able to explain the main regularities of functions.	3	3	2	2	2	2	1	1	2.0
		Average		3.0	2.7	2.0	2.0	1.3	1.3	1.0	1.0	1.8
	Physiology (Nephrophysiology) MMDT 102 T	CO1	To understand the functions of important physiological systems including the urinary systems.	3	3	3	2	1	2	1	1	2.0
		CO2	Students will acquire knowledge on physiology related to Nephrology & Physiology applied to dialysis.	3	3	3	2	2	2	1	1	2.1
		Average		3	3	3	2	1.5	2	1	1	2.1
	Nephrogenetics & Pharmacology (MMDT 103 T)	CO1	This course gives a general knowledge and application part of the drugs or medicines used for renal problems	3	3	3	2	2	2	2	1	2.3
		CO2	Knowledge of renal, cardio vascular, respiratory, Central Nervous System & corticosteroids to be able to manage renal patients under supervision of a nephrologists and assist a nephrologists	3	3	3	2	2	2	2	1	2.3
		Average		3	3.0	3.0	2	2	2	2	1.0	2.3
	Research Methodology & Biostatistics (Core Course) CC 001 L	CO1	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.	3	3	3	3	3	3	3	2	2.9
		Average		3	3	3	3.0	3	3	3	2.0	2.9

Semester 1	**Anatomy (Nephroanatomy & Histology) MMDT 104 P**	CO1	Apply to clinical scenarios the concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology of urinary system	3	2	2	2	1	1	1	1	1.6
		CO2	Students will be able to describe and analyze tissue types and organ structure & know the topics of fundamental anatomy and histology	3	3	2	2	1	1	1	1	1.8
		CO3	Students will know and be able to describe the urinary system of the human body, will be able to describe their structure, location, will be able to explain the main regularities of functions.	3	3	2	2	2	2	1	1	2.0
		Average		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Physiology (Nephrophysiology) MMDT 105 P	CO1	To understand the functions of important physiological systems including the urinary systems.	3	3	3	2	1	2	1	1	2.0
		CO2	Students will acquire knowledge on physiology related to Nephrology & Physiology applied to dialysis.	3	3	3	2	2	2	1	1	2.1
		Average		3.0	3.0	3.0	2.0	1.5	2.0	1.0	1.0	2.1
	MMDT Directed Clinical Education I (MMDT 106 CP)	CO 1	Build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.	3	3	3	3	3	3	3	2	2.9
		CO 2	Emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students; confidence and competence in delivering quality patient care.	3	3	3	3	3	3	3	2	2.9
		CO 3	focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills—key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	3.0	2.0	1.5	2.0	1.0	1.0	2.1
	Research Methodology & Biostatistics (Core Course) CC 001 P	CO1	Student will be able to understand develop statistical models, research designs with the understating of background theory of various commonly used statistical techniques as well as analysis interpretation & reporting of Results and use of statistical software.	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.9
	Aetio-Pathology of Renal Disease (MMDT 107 T)	CO1	The scope of this course is to provide overall information of the pathology, structural abnormalities and symptoms of kidney diseases.	3	3	2	2	1	2	1	1	1.9
		CO2	To have knowledge of common medications used in dialysis, its administration & side effects	3	3	3	3	3	3	3	2	2.9
		CO3	To know total patient care during dialysis & dietary management.	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	2.7	2.7	2.3	2.7	2.3	1.7	2.5
	Clinical Nephrology (MMDT 108 T)	CO1	The students are provided with adequate knowledge of patient assessment in renal diseases.	3	3	3	3	3	3	3	2	2.9
		CO2	The students are trained to apply knowledge of laboratory & imaging investigations for diagnosing renal diseases.	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.9
	Dialysis Equipment (MMDT 109 T)	CO1	To understand the principle of working, construction, operation, uses, cleaning, handling, care, common trouble shooting, maintenance etc of the hemodialysis & peritoneal dialysis equipment	3	3	3	3	3	3	3	2	2.9
		CO2	To conduct routine equipment management procedures including preventative maintenance, faultfinding, calibration and verifying of equipment prior to clinical use.	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.9
	Water Treatment (MMDT 110 T)	CO1	Different types of water source and methods of treatment employed by water supply companies	3	3	2	2	1	2	1	1	1.9
		CO2	Ground sources and surface sources and the classification of contaminants	3	3	2	2	1	2	1	1	1.9
		CO3	Potable water regulations	3	3	3	3	3	3	3	2	2.9
		CO4	Necessity to treat potable water for use in dialysis.	3	3	3	3	3	3	3	2	2.9
		CO5	Need for chemical limits	3	3	2	2	1	2	1	1	1.9
		CO6	Evaluation of feed water quality, including hardness	3	3	3	3	3	3	3	2	2.9
		CO7	Monitoring & disinfection of water treatment	3	3	3	3	3	3	3	2	2.9
		Average		3.0	3.0	2.6	2.6	2.1	2.6	2.1	1.6	2.4
	Clinical Nephrology (MMDT 111 P)	CO1	The students are provided with adequate knowledge of patient assessment in renal diseases.	3	3	3	3	3	3	3	2	2.9
		CO2	The students are trained to apply knowledge of laboratory & imaging investigations for diagnosing renal diseases.	3	3	3	3	3	3	3	2	2.9

Semester 2		Average		3	3	3	3	3	3	3	2	2.9
	Dialysis Equipment (MMDT 1112 P)	CO1	To understand the principle of working, construction, operation, uses, cleaning, handling, care, common trouble shooting, maintenance etc of the hemodialysis & peritoneal dialysis equipment	3	3	3	3	3	3	3	2	2.9
		CO2	To conduct routine equipment management procedures including preventative maintenance, faultfinding, calibration and verifying of equipment prior to clinical use.	3	3	3	3	3	3	3	2	2.9
		Average		3	3	3	3	3	3	3	2	2.9
	MMDT Directed Clinical Education II (MMDT 113 CP)	CO1	Build a robust theoretical foundation, enabling students to understand healthcare practices, disease management, and patient care, thereby empowering them to make informed decisions and adapt to evolving medical technologies.	3	3	3	3	3	3	3	2	2.9
		CO2	Emphasize hands-on training, ensuring proficiency in clinical procedures, diagnostic techniques, and the use of advanced medical equipment. This practical exposure will bridge the gap between theory and practice, enhancing students; confidence and competence in delivering quality patient care.	3	3	3	3	3	3	3	2	2.9
		CO3	focus on developing professionalism, empathy, ethical conduct, teamwork, and communication skills—key traits for holistic patient care and effective collaboration in interdisciplinary healthcare teams.	3	3	3	3	3	3	3	2	2.9
		Average		3	3	3	3	3	3	3	2	2.9
	Innovation and Entrepreneurship (SEC 001 T)	CO1	Students will grasp the concepts of innovation, its ecosystem, and the role of various stakeholders such as government policies, startups, and innovation hubs.	2	3	3	3	3	3	3	3	2.9
		CO2	Cultivating an entrepreneurial mindset and leadership qualities necessary for driving innovation and leading ventures	2	3	3	3	3	3	3	3	2.9
		CO3	Understanding the intersection of technology and innovation and leveraging emerging technologies for entrepreneurial ventures.	3	2	2	3	3	3	3	3	2.8
		Average		2.3	2.7	2.7	3.0	3.0	3.0	3.0	3.0	2.8
	One Health (NPTEL) (SEC 002 T)	CO1	A comprehensive understanding of One Health's role in global health challenges, emphasizing interconnectedness among human, animal, and environmental health.	3	2	2	3	3	3	3	3	2.8
		CO2	Topics include research ethics, disease surveillance, and successes in controlling emerging infectious diseases.	3	2	2	3	3	3	3	3	2.8
		CO3	Students explore disease emergence, transmission, antimicrobial resistance, and food safety, gaining insights into effective public health strategies.	3	2	2	3	3	3	3	3	2.8
		Average		3	2	2	3	3	3	3	3	2.8

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