

Annexure-3.22 of AC-51/2025	
PROGRAM OUTCOME (POs)	
Course Code	M.Sc. MEDICAL RADIOLOGY AND IMAGING TECHNOLOGY
PO1	<b>Advanced Knowledge of Radiology and Imaging Techniques:</b> Graduates will possess in-depth knowledge of the principles, technologies, and clinical applications of various medical imaging modalities (X-ray, CT, MRI, ultrasound, nuclear medicine, etc.) and their role in diagnosis and treatment.
PO2	<b>Technical Proficiency in Imaging Equipment:</b> Graduates will demonstrate the ability to operate, troubleshoot, and maintain advanced radiology and imaging equipment, ensuring safe, accurate, and effective image acquisition.
PO3	<b>Radiation Safety and Protection:</b> Graduates will understand the principles of radiation protection and safety, and will be skilled in minimizing patient exposure to radiation while ensuring high-quality diagnostic images
PO4	<b>Image Analysis and Interpretation:</b> Graduates will be proficient in the interpretation of diagnostic images, identifying normal and abnormal findings, and understanding their significance in clinical practice for accurate diagnosis and treatment planning.
PO5	<b>Research and Evidence-Based Practice:</b> Graduates will be able to critically evaluate and apply current research in medical imaging to enhance practice, contribute to the field's advancement, and engage in evidence-based decision-making in clinical settings.
PO6	<b>Ethical and Professional Practice:</b> Graduates will demonstrate high standards of professional and ethical behavior in patient care, maintaining patient confidentiality, consent, and dignity, while working collaboratively in multidisciplinary healthcare teams.
PO 7	<b>Leadership and Management in Imaging Technology:</b> Graduates will be capable of leading and managing imaging departments or teams, contributing to healthcare administration, quality control, and continuous improvement in imaging practices.
PO8	<b>Continuing Education and Professional Development:</b> Graduates will engage in lifelong learning, staying current with emerging technologies, regulatory standards, and advancements in radiology and imaging technology, contributing to the continuous improvement of healthcare services.
COURSE OUTCOMES (COs)	
Course Code	M.Sc. MEDICAL RADIOLOGY AND IMAGING TECHNOLOGY
SEMESTER I	
MMRIT 101 T MMRIT 103 P	<b>Principles of Radiographic Exposure</b>
CO1	Understanding the basic concepts, theories & method, in applied physics relevant to radiological imaging techniques & image quality
CO2	Categorizing provisions for radiation safety by various national & international regulatory bodies.
CO3	Tagging of different imaging modalities in radiology department
CO4	Differentiating EMR and its application in X –ray diagnosis and therapy.
CO5	Evaluating the factors affecting the image quality from x ray.
MMRIT 102 T	<b>Radiation Protection in Diagnostic Radiology</b>
CO1	Understanding the concepts and methods of radiation protection principles and their applications in radiology department.
CO2	Obtaining knowledge for management and handling the equipment for various procedures.
CO3	Applying the regulations of radiation practices according to internationally accepted methods.
CO4	Practicing the techniques of radiation protection of patients, occupational workers and general public from secondary radiation.
CC 001 T CC 001 P	<b>Research Methodology &amp; Biostatistics (Core Course)</b>
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.
MMRIT 104 CP	<b>MMRIT Directed Clinical Education-I</b>
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.
SEMESTER II	
MMRIT 105 T	<b>Radiological Procedures</b>
CO1	Annotating the basic concepts, theories, techniques & equipment, in and conventional radiography relevant to X-Ray equipment.
CO2	Tagging related anatomy of organ for independently performing different diagnostic radiologic procedures.
CO3	Discussing equipment and supplies necessary to complete special radiographic procedures with administration of contrast media.
CO4	Evaluating the safety aspects of contrast media and describe the allergic reactions associated to use of different contrast media for diagnostic purpose.
MMRIT 106 T	<b>Instrumentation of Conventional Radiological Equipments</b>
CO1	Understanding the basic concepts, theories & method, in applied physics relevant to radiological imaging techniques & image quality.

CO2	Expressing the components and working of equipments related to x-ray
CO3	Operating X-Ray imaging equipment independently
CO4	Demonstrating application of different components of x-ray.
CO5	Analyzing maintenance requirement and care of x ray equipment in radiology department.
<b>MMRIT 107 T</b>	<b>Insturmentation of Specialized Radiology Equipements</b>
CO1	Understanding the basic concepts, theories, techniques & equipments for different interventional radiological procedures.
CO2	Applying the patient preparations needed before & post procedure care in any interventional radiological examination.
CO3	Applying provisions for radiation safety and protection as prescribed by various national & international regulatory bodies.
CO4	Calculating the factors affecting the image quality
CO5	Applying Care, maintenance and tests, Quality assurance program for equipments.
<b>MMRIT 109 CP</b>	<b>MMRIT Directed Clinical Education-II</b>
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.
<b>SKILL EHANCEMENT COURSE</b>	
<b>SEC 001 T</b>	<b>Innvotion and Enterprenuarship</b>
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.
<b>SEC 002 T</b>	<b>One Health (NPTEL)</b>
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)**  
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**CO PO Mapping**  
**Programme - M.Sc. Medical Radiology and Imaging Technology**  
**Semester I and II**

PO1	<b>Advanced Knowledge of Radiology and Imaging Techniques:</b> Graduates will possess in-depth knowledge of the principles, technologies, and clinical applications of various medical imaging modalities (X-ray, CT, MRI, ultrasound, nuclear medicine, etc.) and their role in diagnosis and treatment.
PO2	<b>Technical Proficiency in Imaging Equipment:</b> Graduates will demonstrate the ability to operate, troubleshoot, and maintain advanced radiology and imaging equipment, ensuring safe, accurate, and effective image acquisition.
PO3	<b>Radiation Safety and Protection:</b> Graduates will understand the principles of radiation protection and safety, and will be skilled in minimizing patient exposure to radiation while ensuring high-quality diagnostic images.
PO4	<b>Image Analysis and Interpretation:</b> Graduates will be proficient in the interpretation of diagnostic images, identifying normal and abnormal findings, and understanding their significance in clinical practice for accurate diagnosis and treatment planning.
PO5	<b>Research and Evidence-Based Practice:</b> Graduates will be able to critically evaluate and apply current research in medical imaging to enhance practice, contribute to the field's advancement, and engage in evidence-based decision-making in clinical settings.
PO6	<b>Ethical and Professional Practice:</b> Graduates will demonstrate high standards of professional and ethical behavior in patient care, maintaining patient confidentiality, consent, and dignity, while working collaboratively in multidisciplinary healthcare teams.
PO7	<b>Leadership and Management in Imaging Technology:</b> Graduates will be capable of leading and managing imaging departments or teams, contributing to healthcare administration, quality control, and continuous improvement in imaging practices.
PO8	<b>Continuing Education and Professional Development:</b> Graduates will engage in lifelong learning, staying current with emerging technologies, regulatory standards, and advancements in radiology and imaging technology, contributing to the continuous improvement of healthcare services.

**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	Advanced Knowledge of Radiology and Imaging Techniques	Technical Proficiency in Imaging Equipment	Radiation Safety and Protection	Image Analysis and Interpretation	Research and Evidence-Based Practice	Ethical and Professional Practice	Leadership and Management in Imaging Technology	Continuing Education and Professional Development	Average
				PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
Semester 1	Principle of Radiographic Exposure MMRIT 101 T	CO1	Understanding the basic concepts, theories & method, in applied physics relevant to radiological imaging techniques & image quality	3	3	1	2	0	2	0	3	1.8
		CO2	Categorizing provisions for radiation safety by various national & international regulatory bodies.	2	2	3	1	3	3	2	3	2.4
		CO3	Tagging of different imaging modalities in radiology department	3	3	1	3	3	2	2	3	2.5
		CO4	Differentiating EMR and its application in X-ray diagnosis and therapy.	3	3	1	3	3	1	1	3	2.3
		CO5	Evaluating the factors affecting the image quality from x+D48 ray.	3	3	0	0	3	1	1	3	1.8
		Average		2.8	2.8	1.2	1.8	2.4	1.8	1.2	3.0	2.1
	Radiation Protection in Diagnostic Radiology MMRIT 102 T	CO1	Understanding the concepts and methods of radiation protection principles and their applications in radiology department.	0	2	3	1	3	3	3	3	2.3
		CO2	Obtaining knowledge for management and handling the equipment for various procedures.	0	3	3	2	3	3	3	3	2.5
		CO3	Applying the regulations of radiation practices according to internationally accepted methods.	0	3	3	1	3	3	3	3	2.4
		CO4	Practicing the techniques of radiation protection of patients, occupational workers and general public from secondary radiation.	2	1	3	3	3	3	3	3	2.6

		Average		0.5	2.25	3	1.75	3	3	3	3	2.4
	<b>Research Methodology &amp; Biostatistics CC 001 T</b>	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.	0	0	0	0	3	1	1	2	0.9
		Average		0	0.0	0.0	0	3	1	1	2.0	0.9
	<b>Principle of Radiographic Expousre MMRIT 103 P</b>	CO1	Understanding the basic concepts, theories & method, in applied physics relevant to radiological imaging techniques & image quality	3	3	1	2	0	2	0	3	1.8
		CO2	Categorizing provisions for radiation safety by various national & international regulatory bodies.	2	2	3	1	3	3	2	3	2.4
		CO3	Tagging of different imaging modalities in radiology department	3	3	1	3	3	2	2	3	2.5
		CO4	Differentiating EMR and its application in X-ray diagnosis and therapy.	3	3	1	3	3	1	1	3	2.3
		CO5	Evaluating the factors affecting the image quality from x-ray.	3	3	0	0	3	1	1	3	1.8
		Average		2.8	2.8	1.2	1.8	2.4	1.8	1.2	3.0	2.1
	<b>MMRIT Directed Clinical Education-I MMRIT 104 CP</b>	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	2	2	1	3	3	3	2.5
		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.	1	3	3	3	3	3	3	3	2.8
		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.	1	3	2	2	1	3	3	3	2.3
		Average		1.7	3.0	2.3	2.3	1.7	3.0	3.0	3.0	2.5
	<b>Research Methodology &amp; Biostatistics CC001 P</b>	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	0	0	0	3	1	1	2	1.3
		Average		3	0	0	0	3	1	1	2	1.3
<b>Semester 2</b>	<b>Radiological Procedures MMRIT 105 T</b>	CO1	Annotating the basic concepts, theories, techniques & equipment, in and conventional radiography relevant to X-Ray equipment.	3	3	0	2	2	3	3	2	2.3
		CO2	Tagging related anatomy of organ for independently performing different diagnostic radiologic procedures.	0	3	2	3	1	3	1	3	2.0
		CO3	Discussing equipment and supplies necessary to complete special radiographic procedures with administration of contrast media.	3	3	2	3	1	3	1	3	2.4
		CO4	Evaluating the safety aspects of contrast media and describe the allergic reactions associated to use of different contrast media for diagnostic purpose.	0	1	2	1	1	3	1	2	1.4
		Average		1.5	2.5	1.5	2.3	1.3	3.0	1.5	2.5	2.0
	<b>Instrumentation of Conventional Radiological Equipment MMRIT 106 T</b>	CO1	Understanding the basic concepts, theories & method, in applied physics relevant to radiological imaging techniques & image quality.	3	3	1	3	1	1	2	3	2.1
		CO2	Expressing the components and working of equipments related to x-ray	3	3	1	2	1	3	1	2	2.0
		CO3	Operating X-Ray imaging equipment independently	3	3	2	1	2	3	3	3	2.5
		CO4	Demonstrating application of different components of x-ray.	3	3	1	2	1	3	3	2	2.3
		CO5	Analyzing maintenance requirement and care of x ray equipment in radiology department.	3	3	1	1	1	3	3	3	2.3
		Average		3.0	3.0	1.2	1.8	1.2	2.6	2.4	2.6	2.2

<b>Instrumentation of Specialized Radiology Equipment MMRIT 107 T</b>	CO1	Understanding the basic concepts, theories, techniques & equipments for different interventional radiological procedures.	3	3	1	3	2	3	3	2	2.5
	CO2	Applying the patient preparations needed before & post procedure care in any interventional radiological examination.	0	3	1	3	1	3	3	1	1.9
	CO3	Applying provisions for radiation safety and protection as prescribed by various national & international regulatory bodies.	0	1	3	1	3	3	2	2	1.9
	CO4	Calculating the factors affecting the image quality	0	3	1	3	2	3	3	2	2.1
	CO5	Applying Care, maintenance and tests, Quality assurance program for equipments.	1	1	1	1	3	3	3	3	2.0
	Average		0.8	2.2	1.4	2.2	2.2	3	2.8	2	2.1
<b>Radiological Procedures MMRIT 108 P</b>	CO1	Annotating the basic concepts, theories, techniques & equipment, in and conventional radiography relevant to X-Ray equipment.	3	3	0	2	2	3	3	2	2.3
	CO2	Tagging related anatomy of organ for independently performing different diagnostic radiologic procedures.	0	3	2	3	1	3	1	3	2.0
	CO3	Discussing equipment and supplies necessary to complete special radiographic procedures with administration of contrast media.	3	3	2	3	1	3	1	3	2.4
	CO4	Evaluating the safety aspects of contrast media and describe the allergic reactions associated to use of different contrast media for diagnostic purpose.	0	1	2	1	1	3	1	2	1.4
	Average		1.5	2.5	1.5	2.3	1.3	3.0	1.5	2.5	2.0
<b>MMRIT Directed Clinical Education-II MMRIT 109 CP</b>	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	2	2	1	3	3	3	2.5
	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.	1	3	3	3	3	3	3	3	2.8
	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.	1	3	2	2	1	3	3	3	2.3
	Average		1.7	3.0	2.3	2.3	1.7	3.0	3.0	3.0	2.5
<b>Innovation and Entrepreneurship SEC 001 T</b>	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	0	0	0	3	2	2	3	1.5
	CO2	Cultivating an entrepreneurial mindset and leadership qualities necessary for driving innovation and leading ventures.	1	0	0	0	3	2	3	1	1.3
	CO3	Understanding the intersection of technology and innovation and leveraging emerging technologies for entrepreneurial ventures.	1	0	0	0	3	3	3	3	1.6
	Average		1.3	0.0	0.0	0	3	2.3	2.7	2.3	1.5
<b>ONE Health (NPTEL) SEC 002 T</b>	CO1	A comprehensive understanding of One Health's role in global health challenges, emphasizing interconnectedness among human, animal, and environmental health.	0	0	0	0	2	3	3	3	1.4
	CO2	Topics include research ethics, disease surveillance, and successes in controlling emerging infectious diseases.	0	0	0	0	3	3	3	3	1.5
	CO3	Students explore disease emergence, transmission, antimicrobial resistance, and food safety, gaining insights into effective public health strategies.	0	0	0	0	3	3	3	3	1.5
	Average		0.0	0.0	0.0	0.0	2.7	3.0	3.0	3.0	1.5