MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Manipal College of Health Professions

Manipal Academy of Higher Education, Manipal

Outcome-Based Education (OBE) Framework

Two Years Full Time

Postgraduate Program

(Choice - Based Credit System)

Master of Science in Nuclear Medicine Technology

(M.Sc. NMT)

With effect from July 2021

2. PROGRAM EDUCATION OBJECTIVES (PEOs)

The overall objective of the learning outcome-based curriculum framework (LOCF) for M.Sc. NMT are as follows:

PEO No.	Education Objective
PEO 1	Students will be able to use their fundamental knowledge and clinical competence in Nuclear Medicine Science and Technology as and when required to achieve professional excellence.
PEO 2	Students will demonstrate strong and well defined clinical / practical skills in in nuclear medicine diagnostic and therapeutic procedures, radiation safety, nuclear medicine instrumentation, radiochemistry, radiopharmacy and Research.
PEO 3	Students will be able to practice the profession with highly professional and ethical attitude, strong communication skills, and effective professional skills to work in an inter-disciplinary team.
PEO 4	Students will be able to use interpersonal and collaborative skills to identify, assess and formulate problems and execute the solution/s.
PEO 5	Students will be able to imbibe the culture of research, innovation, entrepreneurship and incubation through evidence-based practices.
PEO 6	Students will be able to participate in lifelong learning process for a highly productive career and will be able to relate the concepts of medicine, biology, radiobiology, nuclear physics and radiochemistry towards serving the cause of the society.

3. GRADUATE ATTRIBUTES

S No.	Attribute	Description
1	**Domain Knowledge**	Demonstrate comprehensive knowledge, competency and understanding of one or more disciplines that form a part of a professional domain
2	**Clinical / Hands-on skills**	Demonstrate clinical / hands-on skills in order to deliver and manage quality health care services
3	**Communication Skills**	Demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups using appropriate media.
4	**Team work**	Demonstrate the ability to effectively and efficiently work and collaborate with diverse teams in the best interest of health care needs of the community
5.	**Professional ethics**	Demonstrate the ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in professional life.
6.	**Research / Innovation-related Skills**	A sense of inquiry and investigation for raising relevant and contemporary questions, synthesizing and articulating.
7.	**Critical thinking and problem solving**	Demonstrate capacity to think critically and extrapolate from what one has learned by applying their competencies and knowledge to solve different kinds of non-familiar problems in real life situations.
8	**Information/Digital Literacy**	Demonstrate capability to use ICT in a variety of learning situations, demonstrate ability to access,

S No.	Attribute	Description
		evaluate, and use a variety of relevant information sources and to use appropriate software for analysis of data.
9	**Multicultural Competence**	Demonstrate knowledge of the values and beliefs of multiple cultures and a global perspective, effectively engage in a multicultural society, interact respectfully with diverse groups.
11.	**Leadership qualities**	Demonstrate leadership capability to formulate an inspiring vision, build a team, motivate and inspire team members to attain organizational vision
12.	**Lifelong Learning**	Demonstrate the ability to acquire knowledge and skills that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to demands of work place through knowledge/skill development/reskilling.

5. PROGRAM OUTCOMES (POs):

After successful completion of M.Sc. Nuclear Medicine Technology program students will be able to:

PO No.	Attribute	Competency
PO 1	**Domain knowledge**	Possess and acquire **scientific knowledge** to work as a health care professional
PO 2	**Clinical/ Hands-on skills**	Demonstrate and possess **clinical and hands-on skills** to provide quality health care services
PO 3	**Team work**	Demonstrate **team work skills** to support shared goals with the interdisciplinary health care team to improve societal health
PO 4	**Ethical value & professionalism**	Possess and demonstrate **ethical values and professionalism** within the legal framework of the society
PO 5	**Communication**	**Communicate effectively** and appropriately with the interdisciplinary health care team and the society
PO 6	**Evidence based practice**	Demonstrate high quality **evidence based practice** that leads to excellence in professional practice
PO 7	**Life-long learning**	Enhance knowledge and skills with the use of advancing technology for the **continual improvement** of professional practice
PO 8	**Entrepreneurship, leadership and mentorship**	Display **entrepreneurship, leadership and mentorship** skills to practice independently as well as in collaboration with the interdisciplinary health care team

6. COURSE STRUCTURE, COURSE WISE LEARNING OBJECTIVE, AND COURSE OUTCOMES (COs)

SEMESTER - I

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
ABS5101	Advanced Biostatistics & Research Methodology	3	1	-	-	4	30	70	100
NMT5101	Physics and Dosimetry in Nuclear Medicine	3	2	-	-	5	50	50	100
NMT5102	Radiopharmacy and Radiopharmaceuticals in Nuclear Medicine	3	2	-	-	5	50	50	100
NMT5103	Radiation Safety and Regulations	3	1	-	-	4	50	50	100
NMT5111	Practicum-I	-	1	2	-	2	100	-	100
	Total	**12**	**7**	**2**	**-**	**20**	**280**	**220**	**500**

Note: ESE for NMT5101, NMT5102, NMT5103 will be conducted for 100 marks and normalized to 50 marks. ESE for ABS5101 will be conducted for 50 marks and normalized to 70 marks.

SEMESTER - II

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P	CL	CR	IAC	ESE	Total
EPG5201	Ethics & Pedagogy	1	1	-	-	2	100	-	100
NMT5201	PET and Therapeutic Radiopharmaceuticals	2	1	-	-	3	50	50	100
NMT5202	Imaging Physics	3	-	-	-	3	50	50	100
NMT5203	Nuclear Medicine Procedures Sec A: Diagnostic Nuclear Medicine Procedures Sec B: Therapeutic Nuclear Medicine Procedures	4	1	-	-	5	50	50	100
NMT5221	Computers in Nuclear Medicine	-	2	2	-	3	100	-	100
NMT5231	Clinical Practices	-	1	-	9	4	100	-	100
	Total	**10**	**6**	**2**	**9**	**20**	**450**	**150**	**600**

Note: ESE for NMT5201, NMT5202, NMT5203 will be conducted for 100 marks and normalized to 50 mark.
ESE for NMT5203 will be held as Section A and Section B with 60 and 40 marks respectively. Two separate question papers will be set as Section A and Section B. Aggregate marks will be used to declare results.

SEMESTER - III

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P/PW	CL	CR	IAC	ESE	Total
NMT6101	Health Information Management in Nuclear Medicine	2	-	-	-	2	100	-	100
NMT6111	Field Training	-	-	4	-	2	100	-	100
NMT6151	Research Project –I	-	1	22	-	12	100	-	100
NMT ****	Program Elective	1	2	-	-	3	50	50	100
Total		**3**	**3**	**26**	**-**	**19**	**350**	**50**	**400**
Note: ESE for NMT **** a program elective will be conducted for 50 marks. Student can take a choice of either one program elective (NMT6011/ NMT6012)									

SEMESTER - IV

Course Code	Course Title	Credit Distribution (hours/week)					Marks Distribution		
		L	T	P/PW	CL	CR	IAC	ESE	Total
NMT6201	Quality Assurance In Nuclear Medicine	2	2	-	-	4	50	50	100
NMT6211	Practicum-II	-	1	8	-	5	50	50	100
NMT6231	Clinical Practices	-	1	-	9	4	100	-	100
NMT6251	Research Project -II	-	1	14	-	8	50	50	100
Total		**2**	**5**	**22**	**9**	**21**	**250**	**150**	**400**
Note: ESE for NMT6201, NMT6211 and NMT6251 will be conducted for 100 marks and normalized to 50 marks.									

Program Elective									
Elective Code	Elective Title	Credit distribution (L,T,P are hours/week)					Marks Distribution		
		L	T	P	CL	C	IAC	ESE	Total
NMT6011	Pre-clinical studies in Nuclear Medicine.	1	2	-	-	3	50	50	100
NMT6012	Cross-sectional imaging								
Note: ESE for NMT **** will be conducted for 50 marks.									