



**SSN** School of Engineering

**DEPARTMENT OF BIOMEDICAL  
ENGINEERING**

**Master of Technology  
MEDICAL ELECTRONICS**

**CURRICULUM**

**REGULATIONS 2026**

## **Vision of the Department**

To be a world-class center of excellence in Biomedical Engineering education and research, integrating innovation, technology, and interdisciplinary collaboration to develop ethical and socially responsible leaders addressing future healthcare challenges.

## **Mission of the Department**

- M1: To provide quality education in Biomedical Engineering with emphasis on niche applications in AI and Data Science, Embedded Electronics, Medical Robotics, and Neurotechnology
- M2: To promote innovative and interdisciplinary research for advancing healthcare technologies and medical device development to global standards.
- M3: To foster industry and institutional collaborations for experiential learning, translational and sustainable outcomes.
- M4: To nurture competent biomedical engineering leaders of tomorrow with strong ethical values, professional excellence, and a commitment to societal well-being.

## **Programme Educational Objectives (PEOs)**

- **PEO1:** Career Advancement – Our postgraduates will be substantiated with the skillset required for healthcare service providers and Medical Technology industry, and profoundly contribute to the research and development in the healthcare field.
- **PEO2:** Professional Growth – Our postgraduates will possess the body of knowledge and skills necessary to operate independently and cooperatively, act responsibly, work effectively in designing, executing, communicating, and documenting the process, thus adding values in their professional practices.
- **PEO3:** Life-long Learning – Our graduates will recognize the need for sustaining and expanding their technical competence and engage in learning opportunities throughout their careers.

## **Programme Outcomes (POs)**

At the end of the programme, the graduates will achieve the following attributes:

- **PO1:** An ability to independently carry out research /investigation and development work to solve practical problems.
- **PO2:** An ability to write and present a substantial technical report/document.
- **PO3:** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program
- **PO4:** Acquiring profound knowledge, field expertise and core competence in the areas of medical electronics.
- **PO5:** An ability to analyse, design, and develop hardware/software-based solutions for medical technology problems.

### PEO - PO Mapping

PEO/PO	PO1	PO2	PO3	PO4	PO5
PEO1	3	2	3	3	3
PEO2	3	3	3	3	3
PEO3	2	1	2	3	2

### COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

Sl. No	Broad Category of Course	Minimum Credit Requirement
1	Department Core Course (DC)	10
2	Major Core Course (MC)	30
3	Multidisciplinary Course (MD)	10
4	Open Elective (OE)	2
5	Project Dissertation (PD)	20
6	Research Internship (RI)	4
5	Skill Enhancement Course (SEC)	4
<b>Total</b>		<b>80</b>

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

Semester\Category	DC	MC	MD	OE	PD	RI	SEC	TOTAL
I	7	8	4	2	-	-	2	<b>23</b>
II	3	14	3	-	-	-	2	<b>22</b>
III	-	8	3	-	8	4	-	<b>23</b>
IV	-	-	-	-	12	-	-	<b>12</b>
<b>Total</b>	10	30	10	2	20	4	4	<b>80</b>

### SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Applied Mathematics for Medical Electronics	MD	4	60	0	0	60	120	4
2		Biomedical Equipment	DC	5	45	0	30	45	120	4
3		Applied Medical Instrumentation	DC	3	45	0	0	45	90	3
4		Biosignal Processing	MC	5	45	0	30	45	120	4
5		Elective 1	MC	5	45	0	30	45	120	4
6		Research Methodology / IPR/Operations Research	OE	2	30	0	0	30	60	2
<b>PRACTICALS</b>										
7		Applied Medical Instrumentation Laboratory	SEC	2	0	15	30	45	60	2
<b>TOTAL</b>				<b>26</b>	<b>18</b>	<b>1</b>	<b>8</b>			<b>23</b>

## SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Elective 2	MD	3	45	0	0	45	90	3
2		Medical Imaging Techniques and Radiotherapy	DC	3	45	0	0	45	90	3
3		Applied Medical Image Processing	MC	5	45	0	30	45	120	4
4		Applied Biomechanics	MC	5	45	0	30	45	120	4
5		Elective 3	MC	3	45	0	0	45	90	3
6		Elective 4	MC	3	45	0	0	45	90	3
<b>PRACTICALS</b>										
7		Medical Device Design Laboratory	SEC	2	0	15	30	45	60	2
<b>TOTAL</b>				<b>24</b>	<b>18</b>	<b>1</b>	<b>6</b>			<b>22</b>

## SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Multi-disciplinary Open Elective	MD	3	45	0	0	45	90	3
2		Elective 5	MC	5	45	0	30	45	120	4
3		Elective 6	MC	5	45	0	30	45	120	4
<b>PRACTICALS</b>										
4		Project/Dissertation Phase I	PD	16	0	0	240	0	240	8
5		Research Internship	RI	0	0	0	120	0	120	4
<b>TOTAL</b>				<b>29</b>	<b>9</b>	<b>0</b>	<b>20</b>			<b>23</b>

## SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
<b>PRACTICALS</b>										
1		Project/Dissertation Phase II	PD	24	0	0	360	0	360	12
<b>TOTAL</b>				<b>24</b>	<b>0</b>	<b>0</b>	<b>24</b>			<b>12</b>

## ELECTIVE 1

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Biomedical Optics and Biophotonics	MC	5	45	0	30	45	120	4
2		Biomedical Data Analysis	MC	5	45	0	30	45	120	4
3		Anatomy and Physiology	MC	5	45	0	30	45	120	4
4		Design Thinking in Healthcare	MC	5	45	0	30	45	120	4
5		Python Programming for Medical Electronics	MC	5	45	0	30	45	120	4

## ELECTIVE 2

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Applied Artificial Intelligence for Healthcare	MD	3	45	0	0	45	90	3
2		Bio MEMS and Lab-on-a-Chip	MD	3	45	0	0	45	90	3
3		Smart wearables in healthcare	MD	3	45	0	0	45	90	3

4		Additive Manufacturing of Medical Devices	MD	3	45	0	0	45	90	3
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### ELECTIVE 3

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Speech and Assistive Technology	MC	3	45	0	0	45	90	3
2		Nanomaterials and Implant Devices	MC	3	45	0	0	45	90	3
3		Robotics and Automation in Medicine	MC	3	45	0	0	45	90	3
4		Assist Devices and Implant Technology	MC	3	45	0	0	45	90	3

### ELECTIVE 4

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Medical Device Design	MC	3	45	0	0	45	90	3
2		Edge Computing for Medical Applications	MC	3	45	0	0	45	90	3
3		Microfluidic Devices and Medical Applications	MC	3	45	0	0	45	90	3
4		Cognitive Neuroscience	MC	3	45	0	0	45	90	3

## ELECTIVE 5

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Computer Vision and Immersive Healthcare Technology	MC	5	45	0	30	45	120	4
2		Embedded Systems and IoMT	MC	5	45	0	30	45	120	4
3		Brain Computer Interface	MC	5	45	0	30	45	120	4
4		Physiological System Modelling and Simulation	MC	5	45	0	30	45	120	4
5		Machine Learning for Healthcare	MC	5	45	0	30	45	120	4

## ELECTIVE 6

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Biomedical Informatics	MC	5	45	0	30	45	120	4
2		Medical Device Regulatory Process	MC	5	45	0	30	45	120	4
3		Rehabilitation Engineering Technology	MC	5	45	0	30	45	120	4
4		Deep Learning Techniques for Healthcare	MC	5	45	0	30	45	120	4
5		FPGAs in Healthcare	MC	5	45	0	30	45	120	4

## MULTI-DISCIPLINARY OPEN ELECTIVE

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	Teaching and Learning Scheme (per Semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Telemedicine and Telehealth Technology	MD	3	45	0	0	45	90	3
2		Clinical Engineering	MD	3	45	0	0	45	90	3
3		Hospital and Healthcare Equipment Management	MD	3	45	0	0	45	90	3
4		Medical Innovation and Entrepreneurship	MD	3	45	0	0	45	90	3

Note: Students from M.Tech. Medical Electronics must not opt for this Open Elective.

L - Lecture, T - Tutorial, P - Practical, TW & SL – Term Work & Self Learning, TH – Total Hours and C – Credits