SHIV NADAR
UNIVERSITY
CHENNAI

SSN School of Engineering

DEPARTMENT OF BIOMEDICAL ENGINEERING

Bachelor of Technology
Biomedical Engineering

CURRICULUM

REGULATIONS 2026

VISION AND MISSION OF THE DEPARTMENT

VISION

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

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.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Our graduates will demonstrate strong foundational knowledge and technical proficiency in Biomedical Engineering, with specialized skills in Artificial Intelligence, Data Science, Embedded Electronics, Medical Robotics, and Neurotechnology to address complex healthcare challenges.

PEO2: Our graduates will engage in innovative, interdisciplinary research and development through active collaboration with industry and academia to translate biomedical innovations into sustainable and impactful healthcare solutions.

PEO3: Our graduates will evolve as ethical, socially responsible, and professionally competent leaders in Biomedical Engineering, contributing effectively to societal well-being and lifelong learning.

PROGRAM OUTCOMES (POs)

Program outcomes are the skills and knowledge which the students should have acquired at the time of graduation. A program outcome indicates what a student can do from course-wise knowledge acquired during the program. Students who graduate from this program shall exhibit the following:

PO	Graduate Attribute	Programme Outcome
1	Engineering Knowledge	Apply the knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization to develop to the solution of complex Engineering problems (WK 1 to 4).
2	Problem Analysis	Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions with consideration for sustained development (WK 1 to 4).
3	Design/Development of solutions	Design creative solutions for complex Engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5).
4	Conduct Investigations of Complex Problems	Conduct investigations of complex Engineering problems using research-based knowledge including design of experiments, modelling, analysis and interpretation of data to provide valid conclusions (WK8).
5	Engineering Tool Usage:	Create, select, and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling, recognizing their limitations to solve complex Engineering problems (WK2 and WK6).
6	The Engineer and The World	Analyze and evaluate societal and environmental aspects while solving complex Engineering problems for their impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5 and WK7).
7	Ethics	Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws (WK9).
8	Individual and Collaborative	Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

	Teamwork.	
9	Communication	Communicate effectively and inclusively within the engineering community and the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
10	Project Management and Finance	Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multi-disciplinary environments.
11	Life-long learning	Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8).

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	To design, analyze, and develop indigenous medical devices that address societal healthcare challenges through the integration of life sciences, engineering, and technology.
PSO2	To apply AI, machine learning, and data science tools to develop intelligent, data-driven diagnostic and therapeutic systems.
PSO3	To translate interdisciplinary research into practical healthcare technologies while upholding ethical standards and societal responsibility.

PEO - PO/PSO Mapping

PEO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
PEO1	3	3	3	2	2	2	2	2	2	2	2	3	3	3
PEO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
PEO3	2	2	2	2	2	2	3	3	3	3	3	3	3	3

Mapping Programme Outcomes with Graduate Attributes

Programme Outcomes		NBA's GAs
PO1:	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop the solution of complex engineering problems.	**GA1**
PO2:	**Problem Analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4).	**GA2**
PO3:	**Design/Development of Solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/ processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society, and environment as required. (WK5).	**GA3**
PO4:	**Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).	**GA4**
PO5:	**Engineering Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).	**GA5**
PO6:	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal	**GA10**

	framework, culture, and environment. (WK1, WK5, and WK7).	
PO7:	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; adhere to national & international laws. (WK9).	**GA10**
PO8:	**Individual and Collaborative Teamwork:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams	**GA6**
PO9:	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.	**GA8**
PO10:	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.	**GA7**
PO11:	**Life-Long Learning:** Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8).	**GA9, G11**

Washington Accord Knowledge Levels (WK)	**Attributes**
WK1	Natural sciences and social sciences
WK2	Conceptually based mathematics
WK3	Engineering fundamentals

WK4	Engineering specialist knowledge
WK5	Engineering design and operations
WK6	Engineering Practice (Technology)
WK7	Engineering knowledge in society, public safety and sustainable development
WK8	Research based knowledge
WK9	Professional ethics, inclusive behaviour and conduct

Complex Engineering Problems (WP)	**Attributes**
WP1	Depth of knowledge required
WP2	Range of conflicting requirements
WP3	Depth of analysis required
WP4	Familiarity of issues
WP5	Extent of applicable codes
WP6	Extent of stakeholder involvement and conflicting requirements
WP7	Interdependence

Complex Engineering Activities (EA)	**Attributes**
EA1	Range of resources
EA2	Level of interactions
EA3	Innovation
EA4	Consequences to the society and environment
EA5	Familiarity

Sustainable Development Goals (SDG)	Details	Sustainable Development Goals (SDG)	Details
SDG 1	No poverty	SDG 10	Reducing inequality
SDG 2	Zero hunger	SDG 11	Sustainable cities and communities
SDG 3	Good health and well-being	SDG 12	Responsible consumption and production
SDG 4	Quality education	SDG 13	Climate action
SDG 5	Gender equality	SDG 14	Life below water
SDG 6	Clean water and sanitation	SDG 15	Life on land
SDG 7	Affordable and clean energy	SDG 16	Peace, justice and strong institutions
SDG 8	Decent work and economic growth	SDG 17	Partnerships for the goals
SDG 9	Industry, innovation and infrastructure		

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	Proposed Credits
1	Major Core (MC)	80	80
2	Minor Stream (MS)	32	32
3	Multidisciplinary (MD)	09	09
4	Ability Enhancement Course (AEC)	08	08
5	Skill Enhancement Course (SEC)	09	09
6	Value Added Courses (VAC)	08	08
7	Summer Internship (SI)	02	02
8	Project Dissertation (PD)	12	12
Total		**160**	**160**

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

Semester\Category	MC	MS	MD	AEC	SEC	VAC	SI	PD	TOTAL
1	6	-	6	3	2	4	-	-	21
2	11	-	3	3	2	2	-	-	21
3	12	5	-	-	4	-	-		21
4	17	2	-	-	1	1	-	-	21
5	14	6	-	-	-	1	-	-	21
6	13	6	-	-	-	-	-	4	23
7	7	8	-	2	-	-	2	6	25
8	-	5	-	-	-	-	-	2	7
Total	80	32	9	8	9	8	2	12	**160**

Credit Breakup of Proposed Curriculum across Course Categories - Detailed

Semester	MC			MS			MD	AEC	SEC	VAC	SI	PD	TOTAL
	SSNSoE	*Dept Major*	*Program Major*	*SSNSoE*	*Dept Minor*	*Program Minor*	*SSNSoE*	*SSNSoE*	*Dept / Program*	*Dept / Program*	*Dept / Program*	*Dept / Program*	
1		6					6	3	2	4			21
2	3	8					3	3	2	2			21
3		12		3	2				4				21
4		14	3		2				1	1			21
5			14		6					1			21
6			13			6						4	23
7			7			8		2			2	6	25
8						5						2	7
Total	3	40	37	3	10	19	9	8	9	8	2	12	160

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics I	MD	3	30	15	0	45	90	3
2		Electric Circuit Theory	MD	4	30	0	30	30	90	3
3		Communicative English	AEC	4	30	0	30	30	90	3
4		Human Anatomy and Physiology	MC	3	45	0	0	45	90	3
5		Principles of Electronic Devices and Circuits	MC	3	45	0	0	45	90	3
6		Professional Ethics and Human Values	VAC	2	30	0	0	30	60	2
7		Programming in Python for Data Science	VAC	3	15	0	30	15	60	2
PRACTICALS										
8		Electronic Devices and Circuits Laboratory	SEC	4	0	0	45	15	60	2
TOTAL				**26**	**225**	**15**	**135**	**255**	**630**	**21**

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics II	MC	3	45	0	0	45	90	3
2		English for Engineers	AEC	4	30	0	30	30	90	3
3		Engineering Physics	MD	4	30	0	30	30	90	3
4		Environmental Engineering	VAC	2	30	0	0	30	60	2
5		Analog and Digital Integrated Circuits	MC	6	45	0	45	60	150	5
6		Biochemistry and Microbiology	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Bioscience and Physiology Laboratory	SEC	4	0	0	30	30	60	2
TOTAL				**26**	**225**	**0**	**135**	**270**	**630**	**21**

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Mathematics III	MS	3	45	0	0	45	90	3
2		Signals, Systems, and Signal Processing	MC	3	45	0	0	45	90	3
3		Medical Physics	MS	2	30	0	0	30	60	2
4		Sensors for Healthcare	MC	2	30	0	0	30	60	2
5		Design Thinking, Innovation, and Entrepreneurship	SEC	4	30	0	30	30	90	3
6		Medical Instrumentation	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Signal Processing Laboratory	SEC	2	0	0	15	15	30	1
8		Medical Instrumentation Laboratory	MC	4	0	0	30	30	60	2
9		Sensors for Healthcare Laboratory	MC	4	0	0	30	30	60	2
TOTAL				**27**	**225**	**0**	**105**	**300**	**630**	**21**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Biomechanics for Human Movements	MC	3	45	0	0	45	90	3
2		Diagnostic and Therapeutic Technologies	MC	3	45	0	0	45	90	3
3		Medical Device Design and Quality Assurance	MS	2	30	0	0	30	60	2
4		Medical Imaging Techniques	MC	3	45	0	0	45	90	3
5		Rehabilitation Engineering	MC	3	45	0	0	45	90	3
6		Biocontrol Systems	MC	3	45	0	0	45	90	3
PRACTICALS										
7		Biomechanics Laboratory	SEC	2	0	0	15	15	30	1

8		Diagnostic and Therapeutic Technologies Laboratory	MC	4	0	0	30	30	60	2
9		Independent Research/Extra Academic Activity	VAC	2	0	0	15	15	30	1
TOTAL				**25**	**255**	**0**	**60**	**315**	**630**	**21**

SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Medical Robotics	MC	3	45	0	0	45	90	3
2		Embedded Systems for Medical Devices	MC	6	45	0	30	45	120	4
3		Medical Image Analysis	MC	6	45	0	30	45	120	4
4		AI in Healthcare	MC	3	45	0	0	45	90	3
5		Biomaterials	MS	3	45	0	0	45	90	3
6		Computational Modeling for Physiological Systems	MS	3	45	0	0	45	90	3
PRACTICALS										
7		Independent Research / Extra Academic Activity	VAC	2	0	0	15	15	30	1
TOTAL				**26**	**270**	**0**	**75**	**285**	**630**	**21**

Note: Students Pursuing GPP should register for an additional course on Project Management and Planning (3 credits) under MS category during V semester and this additional credit earned will be adjusted during VIII semester by exempting a minor course of 3 credits.

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Wearable Devices and Computing	MC	3	45	0	0	45	90	3
2		Medical Data Analytics	MC	6	45	0	30	45	120	4
3		Brain Computer Interface	MC	6	45	0	30	45	120	4
4		Tissue Engineering	MC	2	30	0	0	30	60	2
5		Program Minor 1	MS	3	45	0	0	45	90	3

6		Program Minor 2	MS	3	45	0	0	45	90	3
PRACTICALS										
7		Capstone Project Phase 1	PD	8	0	0	60	60	120	4
TOTAL				**31**	**255**	**0**	**120**	**315**	**690**	**23**

SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Bioinformatics	MC	6	45	0	30	45	120	4
2		Internet of Medical Things (IoMT)	MC	3	45	0	0	45	90	3
3		Program Minor 3	MS	3	45	0	0	45	90	3
4		Program Minor 4	MS	3	45	0	0	45	90	3
5		Program Minor 5	MS	2	30	0	0	30	60	2
6		Ability Enhancement Course Basket	AEC	2	30	0	0	30	60	2
PRACTICALS										
7		Capstone Project Phase 2	PD	12	0	0	90	90	180	6
8		Internship	SI	4	0	0	30	30	60	2
TOTAL				**35**	**240**	**0**	**150**	**360**	**750**	**25**

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Program Minor 6	MS	2	30	0	0	30	60	2
2		Program Minor 7	MS	3	45	0	0	45	90	3
PRACTICALS										
3		Capstone Project Phase 3	PD	4	0	0	30	30	60	2
TOTAL				**9**	**75**	**0**	**30**	**105**	**210**	**7**

Major Core Courses

Department Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Human Anatomy and Physiology	1	3	45	0	0	45	90	3
2		Principles of Electronic Devices and Circuits	1	3	45	0	0	45	90	3
3		Analog and Digital Integrated Circuits	2	6	45	0	45	60	150	5
4		Biochemistry and Microbiology	2	3	45	0	0	45	90	3
5		Signals, Systems, and Signal Processing	3	3	45	0	0	45	90	3
6		Sensors for Healthcare	3	2	30	0	0	30	60	2
7		Medical Instrumentation	3	3	45	0	0	45	90	3
8		Medical Instrumentation Laboratory	3	4	0	0	30	30	60	2
9		Sensors for Healthcare Laboratory	3	4	0	0	30	30	60	2
10		Biomechanics for Human Movements	4	3	45	0	0	45	90	3
11		Diagnostic and Therapeutic Technologies	4	3	45	0	0	45	90	3
12		Medical Imaging Techniques	4	3	45	0	0	45	90	3
13		Biocontrol Systems	4	3	45	0	0	45	90	3
14		Diagnostic and Therapeutic Technologies Laboratory	4	4	0	0	30	30	60	2

Programme Core Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Rehabilitation Engineering	4	3	45	0	0	45	90	3
2		Medical Robotics	5	3	45	0	0	45	90	3
3		Embedded Systems for Medical Devices	5	6	45	0	30	45	120	4
4		Medical Image Analysis	5	6	45	0	30	45	120	4
5		AI in Healthcare	5	3	45	0	0	45	90	3
6		Wearable Devices and Computing	6	3	45	0	0	45	90	3
7		Medical Data Analytics	6	6	45	0	30	45	120	4
8		Brain Computer Interface	6	6	45	0	30	45	120	4
9		Tissue Engineering	6	2	30	0	0	30	60	2
10		Bioinformatics	7	6	45	0	30	45	120	4
11		Internet of Medical Things (IoMT)	7	3	45	0	0	45	90	3

Department Minor Stream Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Medical Physics	3	2	30	0	0	30	60	2
2		Medical Device Design and Quality Assurance	4	2	30	0	0	30	60	2
3		Biomaterials	5	3	45	0	0	45	90	3
4		Computational Modeling for Physiological Systems	5	3	45	0	0	45	90	3

MINOR STREAMS

The Department of Biomedical Engineering offers the following list of Minor Streams.

1. AI and ML
2. Embedded Electronics
3. Medical Robotics and Neurotechnology
4. Bioengineering

Each Minor Stream has seven courses worth 19 credits. The student must enroll in any one of the above three Minor Streams.

MINOR STREAM 1- AI and ML

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Biomedical Signals Analysis Using Machine Learning Techniques	6	3	45	0	0	45	90	3
2		Data Science and Predictive Analytics in Medicine	6	3	45	0	0	45	90	3
3		Deep Learning Techniques for Healthcare	7	3	45	0	0	45	90	3
4		Computer Vision Algorithms and Applications	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the ***Minor Stream Baskets***:

Minor Stream Basket 1 (2 Credit courses)	***Minor Stream Basket 2 (2 Credit courses)***	***Minor Stream Basket 3 (3 Credit courses)***
Healthcare Informatics	Bio-inspired Systems and Applications	AI Ethics and Safety
Bigdata Analytics in Healthcare	Cybersecurity in Healthcare	Theory Of Mind in AI

Soft Computing and Optimization Techniques for Healthcare	Medical Image Retrieval	Edge Computing in Healthcare
Medical Natural Language Processing	Physiological and Behavioural Biometrics	
Explainable AI in Healthcare		

MINOR STREAM 2- Embedded Electronics

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Embedded Medical Devices and Delivery Systems	6	3	45	0	0	45	90	3
2		Real-Time Operating Systems (RTOS)	6	3	45	0	0	45	90	3
3		Embedded Bio-Photonics	7	3	45	0	0	45	90	3
4		Embedded System and Debugging	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the ***Minor Stream Baskets***:

Minor Stream Basket 1 (2 Credit courses)	*Minor Stream Basket 2 (2 Credit courses)*	*Minor Stream Basket 3 (3 Credit courses)*
Micro And Smart Systems in Healthcare	VLSI Design	Embedded Security

Smart Sensors and Actuators for Healthcare	Communication Protocols	System on Chip And FPGA
Embedded Vision in Healthcare	Edge AI for Medical Device	Cloud Analytics for IoMT
Embedded Middleware in Healthcare		
Wireless Communication Technique in Healthcare		

MINOR STREAM 3 - Medical Robotics and Neurotechnology

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Bio Mechatronics	6	3	45	0	0	45	90	3
2		Neuro Prosthetics	6	3	45	0	0	45	90	3
3		Human Robot Interaction	7	3	45	0	0	45	90	3
4		Neuro Electronic Recording and Processing	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the ***Minor Stream Baskets***:

Minor Stream Basket 1 (2 Credit courses)	***Minor Stream Basket 2 (2 Credit courses)***	***Minor Stream Basket 3 (3 Credit courses)***
Affective Computing in Human-Computer Interface	Haptics for Medical Applications	Neuro Marketing

Extended Reality for Healthcare	Neuro Modulation	Wearable robots
Healthcare Autonomous Mobile Robots (HAMRs)	Neuro MorphicComputing	Assistive Technology
Neuroimaging	Theoretical and Computational Neuroscience	Neural Data Analysis
Machine Learning for Human-Computer Interface	Digital Twins in Healthcare	

MINOR STREAM 4 – Bioengineering

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Genetic Engineering	6	3	45	0	0	45	90	3
2		Biophotonics	6	3	45	0	0	45	90	3
3		Nanoscience and Nanotechnology	7	3	45	0	0	45	90	3
4		Biofabrication and Bio printing	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the ***Minor Stream Baskets***:

Minor Stream Basket 1 (2 Credit courses)	***Minor Stream Basket 2 (2 Credit courses)***	***Minor Stream Basket 3 (3 Credit courses)***
Stem Cell and Regenerative Medicine	Molecular Engineering and Docking	Biomimetics
Artificial Organs and Implants	Cancer Bioengineering	Multi omics

Drug Delivery Systems	Hospital waste management	Genetic Circuits for Biosensors
Physiology of Cellular and Molecular Systems	Biomicro Fluidics	Clinical Engineering
Bio MEMS	Cardiovascular Engineering	

MINOR STREAM 5 – Medical Technology (Offered to other Departments)

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Biomedical Instrumentation	6	3	45	0	0	45	90	3
2		Biosignal processing	6	3	45	0	0	45	90	3
3		Computational Imaging in Healthcare	7	3	45	0	0	45	90	3
4		Biostatistics	7	3	45	0	0	45	90	3
5		MINOR STREAM BASKET 1	7	2	30	0	0	30	60	2
6		MINOR STREAM BASKET 2	8	2	30	0	0	30	60	2
7		MINOR STREAM BASKET 3	8	3	45	0	0	45	90	3

The following is the tentative list of courses that may be offered under the ***Minor Stream Baskets to other departments***

Minor Stream Basket 1 (2 Credit courses)	*Minor Stream Basket 2 (2 Credit courses)*	*Minor Stream Basket 3 (3 Credit courses)*
Medical Informatics	Hospital Management	Ethics in Biomedical Research and Clinical Studies
Diagnostic Imaging Systems	Natural and Traditional Therapies in Indian Healthcare	Innovation and Entrepreneurship in Healthcare
Regulatory Affairs and Standards in Medical	Biomedical Waste Management	Molecular biology

Devices		
Digital Health and Telemdicine Systems	Sustainable Health Systems and Public Health Management	
Medical Optics		

Multi-Disciplinary Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Mathematics I	1	3	30	15	0	45	90	3
2		Electric Circuit Theory	1	4	30	0	30	30	90	3
3		Engineering Physics	2	4	30	0	30	30	90	3

Skill Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	Teaching and Learning Scheme (per semester)						
				CONTACT PERIODS	L	T	P	TW&SL	TH	C
1		Electronic Devices and Circuits Laboratory	1	4	0	0	45	15	60	2
2		Bioscience and Physiology Laboratory	2	4	0	0	30	30	60	2
3		Design Thinking, Innovation, and Entrepreneurship	3	4	30	0	30	30	90	3
4		Signal Processing Laboratory	3	2	0	0	15	15	30	1
5		Biomechanics Laboratory	4	2	0	0	15	15	30	1

Ability Enhancement Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Communicative English	1	4	30	0	30	30	90	3
2		English for Engineers	2	4	30	0	30	30	90	3

3		Ability Enhancement Course Basket	7	2	30	0	0	30	60	2

Value Added Courses

S. No.	COURSE CODE	COURSE TITLE	SEMESTER	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW& SL	TH	C
1		Professional Ethics and Human Values	1	2	30	0	0	30	60	2
2		Programming in Python for Data Science	1	3	15	0	30	15	60	2
3		Environmental Engineering	2	2	30	0	0	30	60	2
4		Independent Research/Extra Academic Activity	4	2	0	0	15	15	30	1
5		Independent Research / Extra Academic Activity	5	2	0	0	15	15	30	1

GRAND PROJECT PATHWAY

Semester	Course	Credit
III	Design Thinking, Innovation and Entrepreneurship	3
IV	Independent Research /Extra Academic Activity	1
V	Independent Research /Extra Academic Activity	1
V	Project Management and Planning	3
VI	Capstone Project Phase 1	4
VII	Capstone Project Phase 2	6
VIII	Capstone Project Phase 3	2
	Total Credit for GPP	**20**

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