DEPARTMENT OF BIOMEDICAL ENGINEERING

DEPARTMENT OF BIOMEDICAL ENGINEERING

VISION
To be a pre-eminent learning and research centre in biomedical engineering and raise competent professionals and researchers dedicated to community development and nation building.

MISSION
- To empower students with in depth knowledge in the field of Biomedical Engineering and equip them with problem solving abilities.
- To upskill students in translational research and promote innovation and entrepreneurship leading to publications, patents, and products.
- To instil professional, social, and ethical principles among students contributing to the sustainable development of society through technological interventions.

B.Tech (Biomedical Engineering)

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO I	To demonstrate the skills to recognize healthcare related problems and formulate, analyse and design viable solutions.
PEO II	To exhibit skills in inventions, innovations and entrepreneurship to meet societal needs with the current trends in technology.
PEO III	To have a lifelong learning attitude for a successful professional career in multidisciplinary fields of Engineering and Medicine.

PROGRAM OUTCOMES (POs)
Graduates will have ability to:

PO 1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	To apply the knowledge acquired to solve problems in the field of healthcare at the interface of engineering, biology and physiology.
PSO2	To design and develop cost effective diagnostic, therapeutic and assistive devices in compliance with global standards to enhance the quality of life.
PSO3	To put to practice the analytical and programming skills in the interpretation of medical data.
PSO4	To promote multidisciplinary research for advanced healthcare solutions.

M.Tech Biomedical Instrumentation

Program Educational Objectives (PEOs):

▪ PEO I: To provide students with quality education in the field of biomedical engineering, as well as leadership and social responsibility.

▪ PEO II: To upskill students through state-of-the-art training in medical technology advancements for continuous development.

▪ PEO III: To equip students for a successful professional career in multidisciplinary fields of Engineering, Science and Medicine meeting societal needs.

Program Outcomes (POs) :

Graduates will be able to:

- PO 1: Independently carry out research /investigation and development work to solve practical problems.

- PO 2: Write and present a substantial technical report/document.

- PO 3: 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.

- PO 4: Design biomedical engineering systems by promoting multidisciplinary research for advanced healthcare solutions.

B. Tech (Biomedical Engineering) 2022 Batch
COURSE COMPONENTS AND CURRICULUM
PROGRAMME STRUCTURE

S. No.	Category	Credits
1	Humanities, Social Sciences and Management Courses	8
2	Innovation & Entrepreneurship	10

3	Basic Sciences	18
4	Engineering Sciences	20
5	Professional Core	63
6	Professional Electives	18
7	Open Electives	6
8	Online Courses	5*
9	Internships, Projects, Patent and Products	17
10	Mandatory Courses [Environment studies, Induction Programme, Indian Constitution etc.]	-
	Total	**160+5***

The students shall earn 5 credits through online courses between 2nd and 7th semester (both inclusive)

COURSE COMPONENTS

Basic Science Courses (BSC)						
Sl. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	
1	20MA1021	Multivariable Calculus and Differential Equations	3	1	0	4
2	20MA1022	Matrices, Transforms and Numerical Methods	3	1	0	4
3	20MA2023	Probability, Random Variables and Statistics	3	1	0	4
4	20BM2001	Medical Physics	3	0	0	3
5	22BM2019	Human Anatomy and Physiology	3	0	0	3
				Total		**18**

Engineering Science Courses (ESC)						
Sl. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	
1	22BM2008	Introduction to Biomedical Engineering	3	0	0	3
2	22BM2029	Electrical and Electronics for Biomedical Engineers	3	1	0	4
3	22BM2009	Fundamentals of Electrical and Electronics Engineering Laboratory	0	0	2	1
4	20ME1009	Engineering Drawing and Graphics	0	0	4	2
5	19RO1002	Engineering Practices	1	0	3	2.5
6	18CS1004	Programming for Problem Solving	3	0	0	3
7	18CS1002	Programming for Problem Solving Lab	0	0	3	1.5
8	19BM2033	Python Programming for Biomedical Applications	3	0	0	3
				Total		**20**

Humanities & Social Sciences Including Management Courses (HSMC)						
Sl. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	
Category-1		**Humanities, Social Sciences and Management Courses**				**8**
1	20MS2005	Soft Skills	1	0	0	1
2		Technical Communication / Other Languages • A Stream - Foreign Languages (German/French) • B Stream - Online Course • C Stream - Classroom teaching including lab	2	0	0	2
3	22BM2002	Medical Ethics and Standards	2	0	0	2
4	22BM2003	Hospital Management	3	0	0	3
Category-2		**Innovation and Entrepreneurship**				**10**

			L	T	P	
1	20MS2003	Concepts of Entrepreneurship	1	0	0	1
2	20MS2004	Entrepreneurship and Product Development	3	0	0	3
3	20BM2005	Entrepreneurship for Biomedical Engineers	3	0	0	3
4	MP2921, MP2922, MP2923	Mini Project (Course Oriented Project)	0	0	6	3
				Total		**10**

**PROFESSIONAL CORE COURSES (PCC)**						
Sl. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	
1	22BM2013	Electron Devices and Circuits	3	0	0	3
2	18EC2033	Electron Devices and Circuits Laboratory	0	0	2	1
3	22BM2025	Digital Electronics	3	0	0	3
4	22BM2016	Electrical Circuit Analysis	3	1	0	4
5	22BM2014	Signals and Systems for Biomedical Engineers	3	0	0	3
6	22BM2021	Biomedical Sensors	3	0	0	3
7	22BM2024	Biomedical Sensors and Transducers Laboratory	0	0	2	1
8	22BM2026	Medical Diagnostics and Therapeutic Equipment I	3	0	0	3
9	22BM2011	Signal Conditioning Circuits	3	0	0	3
10	22BM2023	Signal Conditioning Circuits Laboratory	0	0	2	1
11	22BM2007	Control System for Biomedical Engineers	3	0	0	3
12	22BM2017	Image Processing for Medical Applications	3	0	0	3
13	22BM2018	Image processing Laboratory for Medical Applications	0	0	3	1.5
14	22BM2001	Bio signal Processing	3	0	0	3
15	18BM2011	Bio signal Processing Laboratory	0	0	3	1.5
16	22BM2028	Virtual Instrumentation for Biomedical Engineers	3	0	2	4
17	19BM2025	Embedded systems for Biomedical Applications	3	0	0	3
18	22BM2027	Medical Diagnostic and Therapeutic Equipment II	3	0	0	3
19	22BM2005	Biomedical Instrumentation Laboratory	0	0	3	1.5
20	22BM2010	Embedded Systems Laboratory for Biomedical Applications	0	0	3	1.5
21	19BM2007	BioMEMS Technology	3	0	0	3
22	22BM2006	Biomaterials and Artificial Organs	3	0	0	3
23	22BM2015	Medical Imaging Techniques	3	0	0	3
24	22BM2012	Microprocessors and Microcontrollers	3	0	0	3
25	20BM2012	Clinical Training	0	0	2	1
			Total Credits			**63**
**PROFESSIONAL ELECTIVE COURSES (PEC)**						
Sl. No	**Code No.**	**Course Title**	**Hours per week**			**Credits**
			L	**T**	**P**	
1	19BM2001	Sensory and Motor Rehabilitation	3	0	0	3
2	19BM2002	Biomedical Optics	3	0	0	3
3	19BM2003	Biometric Systems	3	0	0	3
4	19BM2004	Nuclear Medicine	3	0	0	3
5	20BM2010	Analytical Instrumentation	3	0	0	3

			L	T	P	
6	19BM2008	Machine Learning and Artificial Intelligence	3	0	0	3
7	19BM2009	Telemedicine	3	0	0	3
8	19BM2011	Patient and Device Safety	3	0	0	3
9	19BM2012	Robots in Healthcare	3	0	0	3
10	19BM2013	Radiological Imaging Techniques	3	0	0	3
11	18BM2012	Computational Intelligence	3	0	0	3
12	19BM2014	Biomechanics	3	0	0	3
13	19BM2029	Medical Equipment Maintenance and Troubleshooting	3	0	0	3
14	22BM2022	Medical Internet of Things	3	0	0	3
15	19BM2032	Cloud Computing Applications in Biomedical Engineering	3	0	0	3
16	19BM2034	Data Analytics for Biomedical Engineering	3	0	0	3
17	19BM2035	Block Chain Technology	3	0	0	3
18	19BM2036	Augmented/Virtual Reality Applications in Biomedical Engineering	3	0	0	3
19	19BM2037	Deep Learning for Biomedical Applications	3	0	0	3
20	20BM2003	Medical Coding	3	0	0	3
21	20BM2004	Cancer Biology	3	0	0	3
22	22BM2004	Modelling of Physiological systems	3	0	0	3
23	20BM2008	Brain Computer Interface	3	0	0	3
24	20MS2007	Business plan	3	0	0	3
25	20MS2008	Artificial Intelligence for Business	3	0	0	3
26	20BM2002	Biochemistry for Biomedical Engineers	3	0	0	3
27	22BM2030	Ergonomics and Sports Mechanics	3	0	0	3
28	22BM2031	3D Printing	3	0	0	3
29	20BM2007	Hospital and Equipment management	3	0	0	3
30	22BM2020	Biology for Engineers	3	0	0	3
			Credits			**18**

OPEN ELECTIVE COURSES (OEC)

Sl. No	Code No.	Course Title	Hours per week			Credits
			L	**T**	**P**	
1	19BM2012	Robots in Healthcare	3	0	0	3
2	19BM2031	Medical Internet of Things	3	0	0	3
			Credits			**6**

ONLINE COURSES

The students shall earn 5 credits through online courses between 2nd and 7th semester (both inclusive)		

PROJECT

Sl. No	Code No.	Course Title	Hours per week			Credits
			L	**T**	**P**	
1	SIP2911	Summer Internship -I	30 Days			2
2	ISP2921	Internship	15 Days			1
3	20BM2998	Project	0	0	32	12
4	20BM2999	Product Development/Patent	0	0	4	2
			Credits			**17**

MANDATORY COURSES

Sl. No	Code No.	Course Title	Hours per week			Credits
			L	**T**	**P**	
1	18CH2001	Environmental Studies	3	0	0	0

2	18MS2014	Constitution of India	2	0	0	0
				Credits		**0**

SEMESTER-WISE CURRICULUM

SEMESTER- I

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1	20MA1021	Multivariable Calculus and Differential Equations	3	0	0	4
2	22BM2029	Electrical and Electronics for Biomedical Engineers	3	1	0	4
3	20BM2001	Medical Physics	3	0	0	3
4	18CS1004	Programming for Problem Solving	3	0	0	3
5	18CS1002	Programming for Problem Solving Laboratory	0	0	3	1.5
6	22BM2009	Fundamentals of Electrical and Electronics Engineering Laboratory	0	0	2	1
7	20ME1009	Engineering Drawing and graphics	0	0	4	2
8		Mandatory Course I	-	-	-	0
				Total		**18.5**

SEMESTER- II

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1		Technical Communication / Other Languages	2	0	0	2
2	20MA1022	Matrices, Transforms and Numerical Methods	3	1	0	4
3	22BM2008	Introduction to Biomedical Engineering	3	0	0	3
4	22BM2013	Electron Devices and Circuits	3	0	0	3
5	18EC2033	Electron Devices and Circuits Laboratory	0	0	2	1
6	22BM2016	Electrical Circuit Analysis	3	1	0	4
7	19RO1002	Engineering Practices	1	0	3	2.5
8		Mandatory Course II	-	-	-	0
9	20MS2005	Soft Skills	1	0	0	1
				Total Credits		**20.5**

SEMESTER- III

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1	20MA2023	Probability, Random Variables and Statistics	3	1	0	4
2	22BM2025	Digital Electronics	3	0	0	3
3	22BM2021	Biomedical Sensors	3	0	0	3
4	22BM2019	Human Anatomy and Physiology	3	0	0	3
5	22BM2024	Biomedical Sensor and Transducers Laboratory	0	0	2	1
6	22BM2002	Medical Ethics and Standards	2	0	0	2
7	22BM2007	Control System for Biomedical Engineers	3	0	0	3
8	20MS2003	Concepts of Entrepreneurship	1	0	0	1
9	MP2921	Mini Project (Course Oriented Project-I)	0	0	2	1
				Total Credits		**21**

SEMESTER- IV

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1	22BM2014	Signals and Systems for Biomedical Engineers	3	0	0	3

2	22BM2026	Medical Diagnostics and Therapeutic Equipments	3	0	0	3
3	22BM2011	Signal Conditioning Circuits	3	0	0	3
4	22BM2023	Signal Conditioning Circuits Laboratory	0	0	2	1
5	22BM2012	Microprocessors and Microcontrollers	3	0	0	3
6	19BM2033	Python Programming for Biomedical Applications	3	0	0	3
7	22BM2005	Biomedical Instrumentation Laboratory	0	0	3	1.5
8	SIP2921	Summer Internship -I	30 Days			2
9	MP2922	Mini Project (Course Oriented Project-II)	0	0	2	1
			Total Credits			**20.5**

SEMESTER- V						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
1	20BM2005	Entrepreneurship for Biomedical Engineers	3	0	0	3
2		Professional Elective 1	3	0	0	3
3		Professional Elective 2	3	0	0	3
4	22BM2001	Biosignal processing	3	0	0	3
5	22BM2003	Hospital Management	3	0	0	3
6	18BM2011	Biosignal processing Laboratory	0	0	3	1.5
7	22BM2027	Medical Diagnostic and Therapeutic Equipment II	3	0	0	3
8	20BM2012	Clinical Training	0	0	2	1
9	ISP2921	Internship	15 days			1
10	MP2923	Mini Project (Course Oriented Project-III)	0	0	2	1
			Total Credits			**22.5**

SEMESTER- VI						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
1	22BM2015	Medical Imaging Techniques	3	0	0	3
2	19BM2025	Embedded systems for Biomedical Applications	3	0	0	3
3		Professional Elective 3	3	0	0	3
4		Professional Elective 4	3	0	0	3
5	22BM2017	Image Processing for Medical Applications	3	0	0	3
6	22BM2010	Embedded System Laboratory for Biomedical Applications	0	0	3	1.5
7	22BM2018	Image Processing Laboratory for Medical Applications	0	0	3	1.5
8	20MS2004	Entrepreneurship and Product Development	3	0	0	3
			Total Credits			**21**

SEMESTER- VII						
S. No.	**Course Code**	**Course Title**	**Hours per Week**			**Credits**
			L	**T**	**P**	
1	19BM2007	BioMEMS Technology	3	0	0	3
2	22BM2006	Biomaterials and Artificial organs	3	0	0	3
3	22BM2028	Virtual Instrumentation for Biomedical Engineers	3	0	2	4
4		Professional Elective 5	3	0	0	3
5		Professional Elective 6	3	0	0	3
6		Open Elective 1	3	0	0	3
7		Open Elective 2	3	0	0	3

			Total Credits			22

SEMESTER- VIII						
S. No.	Course Code	Course Title	**Hours per Week**			Credits
			L	T	P	
1	20BM2998	Project	0	0	32	12
2	20BM2099	Product Development/Patent	0	0	4	2
			Total Credits			14

B.Tech (Biomedical Engineering) with Specialization in
Artificial Intelligence and Machine Learning (from 2020 batch onwards)

Curriculum Components		
Sl. No	Curriculum Component	Credits
1.	Theory and Lab Courses	5
2.	Project	6
3.	Online Courses	3
4.	Certification Program	4
	Total	18

Table 1 – Theory and Lab Courses						
Sl. No	Course Code	Course Title	L	T	P	C
1	19BM2008/ 19BM2037	Machine Learning and Artificial Intelligence/ Deep Learning for Biomedical Applications	3	0	0	3
2	22CS2001	Artificial Intelligence and Machine Learning Laboratory for Healthcare	0	0	4	2

B.Tech (Biomedical Engineering) with Specialization in
Data Science (from 2020 batch onwards)

Curriculum Components		
Sl. No	Curriculum Component	Credits
1.	Theory and Lab Courses	5
2.	Project	6
3.	Online Courses	3
4.	Certification Program	4
	Total	18

Table 1 – Theory and Lab Courses						
Sl. No	Course Code	Course Title	L	T	P	C
1	19BM2034/ 19BM2032	Data Analytics for Biomedical Engineering/ Cloud Computing Applications in Biomedical Engineering	3	0	0	3
2		Data Science Laboratory for Healthcare	0	0	4	2

M.Tech. (Biomedical Instrumentation) – 2021-22 Batch
(Revised Course Components and Curriculum)
M.Tech. (Biomedical Instrumentation) – 2022-23 Batch
COURSE COMPONENTS AND CURRICULUM
PROGRAMME STRUCTURE

S. No	Category	Credits
1	Professional Core Courses	25
2	Professional Elective Courses	15

3	Open Courses – From other technical and/or Emerging courses	3
4	Mini Project / Industrial Training	2
5	Project Phase I and II	23
6	Audit Course 1 & 2	Non-credit
7	Online courses	2*
	Total Credits	68+2*

*The students shall earn 2 credits through online courses between 1st and 3rd semester (both inclusive)

COURSE COMPONENTS

Table 1: PROFESSIONAL CORE COURSES

S. No.	Course Code	Course Name	L	T	P	Credits
1	21BM3001	Medical Instrumentation Design	3	0	0	3
2	21BM3002	Advanced Biomedical Signal Processing	3	0	0	3
3	21BM3031	Advanced Medical Image Processing	3	0	0	3
4	21BM3004	Advanced Healthcare System Design	3	0	0	3
5	21BM3005	Embedded Systems and Programming	3	0	0	3
6	21BM3006	Advanced Biomedical Engineering Laboratory	0	0	4	2
7	21BM3007	Hospital Training	0	0	4	2
8	21BM3008	Medical Image Processing Laboratory	0	0	4	2
9	21BM3009	Medical Devices Development Laboratory	0	0	4	2
10	18MS3104	Research Methodology and IPR	2	0	0	2
		Total Credits				**25**
11	MP3951	Mini Project with Seminar	0	0	4	2
12	21BM3998	Project – Phase I	0	0	16	8
13	21BM3999	Project – Phase II	0	0	30	15
		Grand Total				**50**

Table 2 : PROFESSIONAL ELECTIVE COURSES

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
Elective – I						
1	21BM3010	Medical Sensors and MEMS Technology	3	0	0	3
2	21BM3011	Human Computer Interface	3	0	0	3
3	21BM3012	Human Assistive Devices	3	0	0	3
4	21BM3013	Cognitive Technology for Biomedical Engineers	3	0	0	3
Elective – II						
1	21BM3014	Finite Element Modeling for Biomedical Engineers	3	0	0	3
2	21BM3015	Rehabilitation Engineering	3	0	0	3
3	21BM3016	Machine Learning for Healthcare	3	0	0	3
4	21BM3017	Robotics in Surgery	3	0	0	3
Elective – III						
1	21BM3018	Telehealth Technology	3	0	0	3
2	21BM3019	Hospital and Equipment Management	3	0	0	3
3	21BM3020	Physiological Control Systems	3	0	0	3
4	21BM3021	Ergonomics in Healthcare	3	0	0	3
Elective – IV						
1	21BM3022	Medical Ethics and Safety	3	0	0	3
2	21BM3023	Internet of Things in Healthcare	3	0	0	3
3	21BM3024	Nanotechnology in Medicine	3	0	0	3

		Elective – V				
1	21BM3025	Biomedical Engineering Entrepreneurship	3	0	0	3
2	21BM3026	Energy Audit and Management for Hospitals	3	0	0	3
3	21BM3027	Prosthetic Devices	3	0	0	3
4	21BM3003	Applied Medical Image Processing	3	0	0	3

Table 3: OPEN ELECTIVE COURSES

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1	21BM3028	Artificial Intelligence in Healthcare	3	0	0	3
2	21BM3029	Advanced RISC Machine in Biomedical Applications	3	0	0	3
3	21BM3030	Tissue Engineering and Artificial Organs	3	0	0	3

Table 4 : AUDIT COURSE (MANDATORY COURSES)

S. No.	Course Code	Course Title	Hours per Week			Credits
			L	T	P	
1	18VE3001	Value Education	0	0	2	0
2	18EN3001	English for Research Paper Writing	2	0	0	0

Table 5: ONLINE COURSES

Online Courses (2 credits)

The students shall earn 2 credits through online courses between 1st and 3rd semester (both inclusive)

SEMESTER-WISE CURRICULUM

SEMESTER – 1   (Total Credits – 18)

Sl. No	Core/ Elective	Course Code	Course Title	L	T	P	Credits
1.	Core 1	21BM3001	Medical Instrumentation Design	3	0	0	3
2.	Core 2	21BM3002	Advanced Biomedical Signal Processing	3	0	0	3
3.	PE1	21BM3010/ 21BM3011/ 21BM3012/ 21BM3013	Medical Sensors and MEMS Technology/Human Computer Interface/Human Assistive Devices/Cognitive Technology for Biomedical Engineers	3	0	0	3
4.	PE2	21BM3014/ 21BM3015/ 21BM3016/ 21BM3017	Finite Element Modeling for Biomedical Engineers/ Rehabilitation Engineering/Machine Learning for Healthcare/Robotics in Surgery	3	0	0	3
5.	LAB I	21BM3006	Advanced Biomedical Engineering Laboratory	0	0	4	2
6.	LAB II	21BM3007	Hospital Training	0	0	4	2
7.		18MS3014	Research Methodology and IPR	2	0	0	2
8.	Audit		Audit Course	0	0	2	0

SEMESTER 2   (Total Credits – 21)

Sl. No	Core/ Elective	Course Code	Course Title	L	T	P	Credits
9.	Core 3	21BM3031	Advanced Medical Image Processing	3	0	0	3
10.	Core 4	21BM3004	Advanced Healthcare System Design	3	0	0	3
11.	Core 5	21BM3005	Embedded Systems and Programming	2	0	2	3
12.	PE 3	21BM3018/ 21BM3019/ 21BM3020/	Telehealth Technology/ Hospital and Equipment Management/ Physiological Control Systems/	3	0	0	3

	Core/ Elective	Course Code	Course Title	L	T	P	Credits
		21BM3021	Ergonomics in Healthcare				
13.	PE4	21BM3022/ 21BM3023/ 21BM3024/	Medical Ethics and Safety / Internet of Things in Healthcare/ Nanotechnology in Medicine	3	0	0	3
14.	LAB 3	21BM3008	Medical Image Processing Laboratory	0	0	4	2
15.	LAB 4	21BM3009	Medical Devices Development Lab	0	0	4	2
16.		MP3951	Mini Project with Seminar	0	0	4	2
17.			Audit Course	2	0	0	0
Semester-3(Total Credits – 14)							
	Core/ Elective	**Course Code**	**Course Title**	**L**	**T**	**P**	**Credits**
18.	PE 5	21BM3025/21BM3026/21BM3027	Biomedical Engineering Entrepreneurship/Energy Audit and Management for Hospitals/ Prosthetic Devices	3	0	0	3
19.	OE 5	21BM3028/21BM3029/21BM3030	Artificial Intelligence in Healthcare /Advanced RISC Machine in Biomedical Applications/Tissue Engineering and Artificial Organs	3	0	0	3
20.	Major Project	21BM3998	Project - Phase I	0	0	16	8
Semester-4 (Total Credits – 15)							
21.	Major Project	21BM3999	Project - Phase II	0	0	30	15
			TOTAL CREDITS				**68**