DEPARTMENT OF BIOMEDICAL ENGINEERING

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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.
	Identify, formulate, review research literature, and analyze complex engineering problems reaching
PO2	substantiated conclusions using first principles of mathematics, natural sciences, and engineering
	sciences.
	Design solutions for complex engineering problems and design system components or processes that
PO3	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
PO4	interpretation of data, and synthesis of the information to provide valid conclusions.
	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools
PO5	including prediction and modeling to complex engineering activities with an understanding of the
	limitations.
DOC	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and
PO6	cultural issues and the consequent responsibilities relevant to the professional engineering practice.
DO7	Understand the impact of the professional engineering solutions in societal and environmental
PO7	contexts, and demonstrate the knowledge of, and need for sustainable development.
DOO	Apply ethical principles and commit to professional ethics and responsibilities and norms of the
PO8	engineering practice.
DOO	Function effectively as an individual, and as a member or leader in diverse teams, and in
PO9	multidisciplinary settings.
	Communicate effectively on complex engineering activities with the engineering community and
PO10	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.
	, ,

	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

		COURSE COMPONENTS				
		Basic Science Courses (BSC)				
Sl.	Code No.	Course Title			per	Credits
No			-	ek		
1	201441021	Maria de la	L	T	P	4
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
				To	tal	18
	1	Engineering Science Courses (ESC)				
Sl.	Code No.	Course Title			per	Credits
No			-	ek	1	
			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	0	0	2	1
		Laboratory				
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
					Fotal	20
		manities & Social Sciences Including Management Courses				
Sl.	Code No.	Course Title			per	Credits
No				ek		
			L	T	P	
Cate	egory-1	Humanities, Social Sciences and Management Courses				8
1	20MS2005	Soft Skills	1	0	0	1
2		Technical Communication / Other Languages	2	0	0	2
		A Stream - Foreign Languages (German/French)				
		B Stream - Online Course				
		C Stream - Classroom teaching including lab				
3	22BM2002	Medical Ethics and Standards	2	0	0	2
4	22BM2003	Hospital Management	3	0	0	3
Cate	egory-2	Innovation and Entrepreneurship				10

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
			To	otal		10

		PROFESSIONAL CORE COURSES (PCC)				
Sl. No	Code No.	Course Title	Н	ours j 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	0	0	2	1.5
		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
				Tota	l	63
			(Credi	ts	03
		PROFESSIONAL ELECTIVE COURSES (PEC)				
Sl.	Code No.	Course Title	He	ours	per	
No				week	S	Credits
			L		P	
1	19BM2001	Sensory and Motor Rehabilitation	3		0	3
2	19BM2002	Biomedical Optics	3		0	3
3	19BM2003	Biometric Systems	3		0	3
4	19BM2004	Nuclear Medicine	3		0	3
5	20BM2010	Analytical Instrumentation	3	0	0	3

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	3	0	0	
		Engineering				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
	22BM2020	Biology for Engineers	3	0	0	3
30	ZZDIVIZUZU	Diology for Engineers				
30	22 D W12U2U			edit		18
		OPEN ELECTIVE COURSES (OEC)	Cr	edit	S	
Sl.	Code No.		Cr	edit	s per	18
		OPEN ELECTIVE COURSES (OEC)	Cr	edit ours wee	s per ek	
Sl.	Code No.	OPEN ELECTIVE COURSES (OEC) Course Title	H	ours wee	s per ek P	18 Credits
Sl. No	Code No. 19BM2012	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare	Cr H	ours wee	s per ek P	18 Credits
Sl. No	Code No.	OPEN ELECTIVE COURSES (OEC) Course Title	H L 3 3	ours wee	s per ek P 0 0	Credits 3 3
Sl. No	Code No. 19BM2012	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things	H L 3 3	ours wee	s per ek P 0 0	18 Credits
Sl. No	19BM2012 19BM2031	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES	H L 3 3 Cr	ours wee T 0	s per ek P 0 0 s	18 Credits 3 3 6
Sl. No	19BM2012 19BM2031	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th	H L 3 3 Cr	ours wee T 0	s per ek P 0 0 s	18 Credits 3 3 6
Sl. No	19BM2012 19BM2031	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive)	H L 3 3 Cr	ours wee T 0	s per ek P 0 0 s	18 Credits 3 3 6
Sl. No	Code No. 19BM2012 19BM2031 The students	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT	H L 3 3 Cr	ours wee T 0 0	s per ek P 0 0 s	18 Credits 3 3 6
Sl. No 1 2 Sl.	19BM2012 19BM2031	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive)	H L 3 3 Cr Seme	vectors T 0 0 0 redit	s per ek P 0 0 s	18 Credits 3 3 6
Sl. No	Code No. 19BM2012 19BM2031 The students	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT	Howe	veedit T 0 0 redit	s per ek P 0 0 s (both	18 Credits 3 3 6
Sl. No	Code No. 19BM2012 19BM2031 The students Code No.	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title	Hower L	ours eek T	s per ek P 0 0 s (both per P	Credits 3 3 6 Credits
Sl. No 1 2 Sl. No	Code No. 19BM2012 19BM2031 The students Code No. SIP2911	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I	Howe L 30	vedit T 0 0 redit ours ester ours esk T Day	s per ek P 0 0 0 s (both Per P //S	18 Credits 3 3 6 Credits
Sl. No 1 2 Sl. No 1 2	Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship	H	redit vec T 0 0 redit cours ester Day Day	s per ek P 0 0 s (both per P //S //S	18 Credits 3 3 6 Credits 2 1
Sl. No 1 2 Sl. No 1 2 3	The students Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project	Ho Ho Semestrate Ho	redit vec T 0 0 cedit ester Day Day 0	S P O O S	18 Credits 3 3 6 Credits 2 1 12
Sl. No 1 2 Sl. No 1 2	Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship	Ho We L 30 15 0 0	redit vec T 0 0 redit redit Durs ek T Day 0 0 0	s s per ek	18 Credits 3 3 6 Credits 2 1 12 2
Sl. No 1 2 Sl. No 1 2 3	The students Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project Product Development/Patent	Ho We L 30 15 0 0	redit vec T 0 0 cedit ester Day Day 0	s s per ek	18 Credits 3 3 6 Credits 2 1 12
Sl. No 1 2 Sl. No 1 2 3 4	The students Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project	H	vedit ours ours edit ours purs ek T Day Day ours ours	S P O O S (both P P P	18 Credits 3 3 6 Credits 2 1 12 2
Sl. No 1 2 Sl. No 1 2 Sl. No 1 2 3 4	Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998 20BM2999	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project Product Development/Patent MANDATORY COURSES	Ho Ho Cr Cr Ho Cr Cr Cr Cr Cr Cr Cr C	redit ours ours ester Day Day O redit	S P O O S (both P P P	18 Credits 3 3 6 Credits 2 1 12 2 17
Sl. No 1 2 Sl. No 1 2 3 4	The students Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project Product Development/Patent	Ho Ho Cr Ho Cr Ho Cr Ho Cr Cr Ho Cr Ho Cr Cr Cr Cr Cr Cr Cr C	redit vec T 0 0 redit ester Day Day 0 0 redit	S P O O S	18 Credits 3 3 6 Credits 2 1 12 2
Sl. No 1 2 Sl. No 1 2 Sl. No 1 2 3 4	Code No. 19BM2012 19BM2031 The students Code No. SIP2911 ISP2921 20BM2998 20BM2999	OPEN ELECTIVE COURSES (OEC) Course Title Robots in Healthcare Medical Internet of Things ONLINE COURSES shall earn 5 credits through online courses between 2 nd and 7 th inclusive) PROJECT Course Title Summer Internship -I Internship Project Product Development/Patent MANDATORY COURSES	Ho Ho Cr Cr Ho Cr Cr Cr Cr Cr Cr Cr C	redit ours ours ester Day Day O redit	S P O O S (both P P P	18 Credits 3 3 6 Credits 2 1 12 2 17

2	18MS2014	Constitution of India	2	0	0	0
				edit		0

SEMESTER-WISE CURRICULUM

		SEMESTER-WISE CURRICULUS SEMESTER- I	<u>V1</u>			
S.	Course		Hor	ırs per '	Week	Credits
No.	Code	Course Title	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.	Course	Course Title		per We		Credits
No.	Code		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
	1		T	otal Cre	dits	20.5
	T ~	SEMESTER- III	1	_		
S.	Course	Course Title		ırs per		Credits
No.	Code		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
9	20MS2003	Concepts of Entrepreneurship	1	0	2	1
9	MP2921	Mini Project (Course Oriented Project-I)	0			1
	1	SEMESTER- IV	10	otal Cre	uits	21
S.	Course	Course Title	Цент	non W	olz	Credits
S. No.	Code	Course True	L	per We	Р	Credits
1	22BM2014	Signals and Systems for Biomedical Engineers	3	0	0	3
	1	1	1	1	1	l

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	3	0	0	3
		Applications				
7	22BM2005	Biomedical Instrumentation Laboratory	0	0	3	1.5
8	SIP2921	Summer Internship -I		30 Day	S	2
9	MP2922	Mini Project (Course Oriented Project-II)	0	0	2	1
		, ,	To	tal Cre	dits	20.5
		SEMESTER- V				
S.	Course	Course Title	Hou	ırs per \	Week	Credits
No.	Code		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	3	0	0	3
		Equipment II				
8	20BM2012	Clinical Training	0	0	2	1
9	ISP2921	Internship		15 days	8	1
10	MP2923	Mini Project (Course Oriented Project-III)	0	0	2	1
			Total Credits			22.5
			10	otai Cre	eaus	44.5
		SEMESTER- VI	10	otal Cre	eaits	22.5
S.	Course	SEMESTER- VI Course Title	Hou	ırs per \	Week	Credits
S. No.	Code		Hou L			1
		Course Title Medical Imaging Techniques	Hou L 3	ırs per \	Week	Credits 3
No. 1 2	Code	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications	Hou L 3	rs per V	Week P 0 0	Credits 3 3
No. 1 2 3	Code 22BM2015	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3	Hou L 3 3 3 3	1rs per \(\bar{\textbf{T}} \\ 0 \\ 0 \\ 0 \\ 0 \\ \ 0 \\ \ \ \ \	Week P 0 0 0 0	Credits 3 3 3 3
No. 1 2 3 4	Code 22BM2015 19BM2025	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications	Hou L 3 3 3 3 3 3	rs per V	Week P 0 0	Credits 3 3 3 3 3
No. 1 2 3 4 5	Code 22BM2015	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications	Hot L 3 3 3 3 3 3 3 3	1rs per \(\bar{\textbf{T}} \\ 0 \\ 0 \\ 0 \\ 0 \\ \ 0 \\ \ \ \ \	Week P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Credits 3 3 3 3 3 3 3
No. 1 2 3 4	Code 22BM2015 19BM2025	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical	Hou L 3 3 3 3 3 3	1rs per \(\begin{aligned} \textbf{T} & 0 & \\ 0 & 0 & \\ 0 & \\ 0 & \\ 0 & \\ \ 0 & \\ \ \ \	Week P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Credits 3 3 3 3 3
No. 1 2 3 4 5	Code 22BM2015 19BM2025 22BM2017 22BM2010	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications	Hou L 3 3 3 3 3 0	1 T 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week P 0 0 0 0 0 3	Credits 3 3 3 3 3 1.5
No. 1 2 3 4 5	Code 22BM2015 19BM2025 22BM2017	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical	Hot L 3 3 3 3 3 3 3 3	1rs per \(\begin{aligned} \textbf{T} & 0 & \\ 0 & 0 & \\ 0 & 0 & \\ 0 & \\ 0 & \\ 0 & \\ 0 & \\ \ 0 & \\ \ \ \	Week P 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Credits 3 3 3 3 3 3 3
No. 1 2 3 4 5 6	22BM2015 19BM2025 22BM2017 22BM2010 22BM2018	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications	Hou L 3 3 3 3 3 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week P 0 0 0 0 0 3	Credits 3 3 3 3 1.5 1.5
No. 1 2 3 4 5	Code 22BM2015 19BM2025 22BM2017 22BM2010	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical	Hot L 3 3 3 3 3 3 0 0 0 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week P 0 0 0 0 0 3	Credits 3 3 3 3 3 1.5 1.5 1.5
No. 1 2 3 4 5 6	22BM2015 19BM2025 22BM2017 22BM2010 22BM2018	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development	Hot L 3 3 3 3 3 3 0 0 0 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week P 0 0 0 0 0 3	Credits 3 3 3 3 1.5 1.5
No. 1 2 3 4 5 6 7	22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004	Course Title Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER-VII	Hou L 3 3 3 3 3 0 0 0 0 3 To	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week P 0 0 0 0 0 3 3 0 dits	Credits 3 3 3 3 1.5 1.5 1.5 3 21
No. 1 2 3 4 5 6 7 8	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development	Hou L 3 3 3 3 3 0 0 Hou Hou	T 0 0 0 0 0 0 0 0 0 tal Cre	Week	Credits 3 3 3 3 3 1.5 1.5 1.5
No. 1 2 3 4 5 6 7	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER-VII Course Title	Hou L 3 3 3 3 3 0 0 Hou L	T 0 0 0 0 0 0 0 0 0 tal Cre	Week	Credits 3 3 3 3 1.5 1.5 3 21
No. 1 2 3 4 5 6 7 8 S. No. 1	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER- VII Course Title BioMEMS Technology	Hou L 3 3 3 3 3 0 0 Hou L 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5 21
No. 1 2 3 4 5 6 7 8 No. 1 2	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007 22BM2006	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER- VII Course Title BioMEMS Technology Biomaterials and Artificial organs	Hou L 3 3 3 3 3 0 0 1 Hou L 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	P	Credits 3 3 3 3 1.5 1.5 3 21
No. 1 2 3 4 5 6 7 8 S. No. 1	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER-VII Course Title BioMEMS Technology Biomaterials and Artificial organs Virtual Instrumentation for Biomedical	Hou L 3 3 3 3 3 0 0 Hou L 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5 21
No. 1 2 3 4 5 6 7 8 S. No. 1 2 3	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007 22BM2006	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER-VII Course Title BioMEMS Technology Biomaterials and Artificial organs Virtual Instrumentation for Biomedical Engineers	Hou L 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5
No. 1 2 3 4 5 6 7 8 No. 1 2 3 4 4 4 4	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007 22BM2006	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER- VII Course Title BioMEMS Technology Biomaterials and Artificial organs Virtual Instrumentation for Biomedical Engineers Professional Elective 5	Hou L 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5
No. 1 2 3 4 5 6 7 8 No. 1 2 3 4 5 5 6 5 7 8	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007 22BM2006	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER- VII Course Title BioMEMS Technology Biomaterials and Artificial organs Virtual Instrumentation for Biomedical Engineers Professional Elective 5 Professional Elective 6	Hou L 3 3 3 3 0 0 4 Hou L 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5
No. 1 2 3 4 5 6 7 8 No. 1 2 3 4 4 4	Code 22BM2015 19BM2025 22BM2017 22BM2010 22BM2018 20MS2004 Course Code 19BM2007 22BM2006	Medical Imaging Techniques Embedded systems for Biomedical Applications Professional Elective 3 Professional Elective 4 Image Processing for Medical Applications Embedded System Laboratory for Biomedical Applications Image Processing Laboratory for Medical Applications Entrepreneurship and Product Development SEMESTER- VII Course Title BioMEMS Technology Biomaterials and Artificial organs Virtual Instrumentation for Biomedical Engineers Professional Elective 5	Hou L 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Week	Credits 3 3 3 3 1.5 1.5

			Total Credits			22		
	SEMESTER- VIII							
S.	Course	Course Title	Hou	ırs per V	Veek	Credits		
No.	Code		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)

Curricu	ılum Compone	nts				-	
Sl. No		Curriculum Component					
1.	Theory and L	ab Courses		5			
2.	Project			6			
3.	Online Cours	es		3			
4.	Certification	Program	4				
		Total	18				
Table 1	- Theory and	Lab Courses					
Sl. No	Course Code	Course Title	L	Т	P	C	
1	19BM2008/ 19BM2037					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	Т	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 COURS							
S. No.	Course Code	Course Title		ours j Weel		Credits			
N									
140.			L	T	P				
110.		Elective – I	L	Т	P				
1	21BM3010	Elective – I Medical Sensors and MEMS Technology	3	T	P 0	3			
	21BM3010 21BM3011		3			3			
1		Medical Sensors and MEMS Technology	3	0	0				
1 2	21BM3011	Medical Sensors and MEMS Technology Human Computer Interface	3	0 0	0 0	3			
1 2 3	21BM3011 21BM3012 21BM3013	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II	3 3 3	0 0 0	0 0 0	3 3 3			
1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers	3 3 3 3	0 0 0 0	0 0 0 0	3 3 3			
1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering	3 3 3 3 3	0 0 0 0	0 0 0	3 3 3 3			
1 2 3 4 1 2 3	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare	3 3 3 3 3 3	0 0 0 0	0 0 0 0	3 3 3 3 3 3			
1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery	3 3 3 3 3	0 0 0 0	0 0 0	3 3 3 3			
1 2 3 4 1 2 3	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III	3 3 3 3 3 3 3	0 0 0 0 0	0 0 0 0	3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology	3 3 3 3 3 3 3	0 0 0 0 0	0 0 0 0 0	3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management	3 3 3 3 3 3 3 3	0 0 0 0 0 0 0	0 0 0 0 0 0 0	3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019 21BM3020	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management Physiological Control Systems	3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management Physiological Control Systems Ergonomics in Healthcare	3 3 3 3 3 3 3 3	0 0 0 0 0 0 0	0 0 0 0 0 0 0	3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019 21BM3020 21BM3021	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management Physiological Control Systems Ergonomics in Healthcare Elective – IV	3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019 21BM3020 21BM3021	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management Physiological Control Systems Ergonomics in Healthcare Elective – IV Medical Ethics and Safety	3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 3			
1 2 3 4 1 2 3 4 1 2 3 4	21BM3011 21BM3012 21BM3013 21BM3014 21BM3015 21BM3016 21BM3017 21BM3018 21BM3019 21BM3020 21BM3021	Medical Sensors and MEMS Technology Human Computer Interface Human Assistive Devices Cognitive Technology for Biomedical Engineers Elective – II Finite Element Modeling for Biomedical Engineers Rehabilitation Engineering Machine Learning for Healthcare Robotics in Surgery Elective – III Telehealth Technology Hospital and Equipment Management Physiological Control Systems Ergonomics in Healthcare Elective – IV	3 3 3 3 3 3 3 3 3 3	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	3 3 3 3 3 3 3 3 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		ours j Weel		Credits			
140.			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 COURS	SES)						
S.			Ho	urs p	er				
No.	Course Code	Course Title	Week			Credits			
140.			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)									
T	he students shall	earn 2 credits through online courses between $1^{ m st}$ and $3^{ m rd}$	seme	ster (both i	nclusive)			

SEMESTER-WISE CURRICULUM #FSTFR = 1 (Total Credits = 18)

1.		SEMESTER – 1 (Total Credits – 18)							
2.			0 0 0 0 0 0 0 0	Course Title	L	Т	P	Credits	
A. PE1	1.	Core 1	21BM3001	Medical Instrumentation Design	3	0	0		
A. PE1	2.	Core 2	21BM3002	Advanced Biomedical Signal Processing	3	0	0	3	
A. PE2	3.	PE1	21BM3011/ 21BM3012/	Technology/Human Computer Interface/Human Assistive Devices/Cognitive	3	0	0	3	
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. Core/ Elective Code Course Title L T P Credit 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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	4.	PE2	21BM3014/ 21BM3015/ 21BM3016/	Finite Element Modeling for Biomedical Engineers/ Rehabilitation Engineering/Machine Learning for	3	0	0	3	
7. 18MS3014 Research Methodology and IPR 2 0 0 2 8. Audit Audit Course 0 0 2 0 SEMESTER 2 (Total Credits – 21) Sl. Core/ Elective Code Course Title L T P Credit 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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	5.	LAB I	21BM3006	Advanced Biomedical Engineering Laboratory	0	0	4	2	
8. Audit Audit Course 0 0 2 0 SEMESTER 2 (Total Credits – 21) Sl. No Elective No Elective Course Code Code Course Title L T P Credit 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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	6.	LAB II	21BM3007	Hospital Training	0	0	4	2	
SEMESTER 2 (Total Credits – 21) Sl. No Core/ Elective Code Course Title L T P Credit 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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	7.		18MS3014	Research Methodology and IPR	2	0	0	2	
Sl. No Core/ Elective Course Code Course Title L T P Credit 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/ Telehealth Technology/ Hospital and Equipment Management/ 3 0 0 3	8.	Audit		Audit Course	0	0	2	0	
No Elective Code Course Title L T P Credit 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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3				SEMESTER 2 (Total Credits – 21)					
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 21BM3019/ Hospital and Equipment Management/ 3 0 0 3				Course Title	L	T	P	Credits	
Core 4 21BM3004 Advanced Healthcare System Design 3 0 0 3 3 3 3 3 3 3	9.	Core 3	21BM3031	Advanced Medical Image Processing	3	0	0	3	
21BM3018/ Telehealth Technology/ 12. PE 3 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	10.	Core 4	21BM3004	Advanced Healthcare System Design	3	0	0	3	
12. PE 3 21BM3019/ Hospital and Equipment Management/ 3 0 0 3	11.	Core 5	21BM3005	Embedded Systems and Programming	2	0	2	3	
	12.	PE 3	21BM3019/	Hospital and Equipment Management/	3	0	0	3	

		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	Credit s
18.	PE 5	21BM3025/2 1BM3026/21 BM3027	Biomedical Engineering Entrepreneurship/Energy Audit and Management for Hospitals/ Prosthetic Devices	3	0	0	3
19.	OE 5	21BM3028/2 1BM3029/21 BM3030	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