R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

			1 st Semester					
Sl No	Paper Category	Paper Code	Theory	(Contact	Hours	/Week	Credit Points
				L	T	P	Total	
			A. THEORY					
1	BS	M 101	Mathematics -I	3	1	0	4	4
2	BS	CH 101/ PH 101	Chemistry (Gr. A)/ Physics- I (Gr. B)	3	0	0	3	3
3	ES	EE 101/ EC 101	Basic Electrical Engineering (Gr.A) / Basic Electronics Engineering (Gr. B)	3	0	0	3	3
4	HU	HU 101	English	2	0	0	2	2
Tota	of Theory	•					12	12
			B. PRACTICAL					
5	BS	CH 191	Chemistry Lab	0	0	3	3	1.5
6	ES	EE 191/ EC 191	Basic Electrical Engineering Lab (Gr.A)/ Basic Electronics Engineering (Gr. B)	0	0	3	3	1.5
7	ES	ME 191/ ME 192	Engineering Graphics & Design (Gr A) / Workshop/Manufacturing Practices (Gr-B)	0	0	3	3	1.5
8	PROJ	PR191	Project-IA	0	0	1	1	0.5
9	PROJ	PR192	Project-IB	0	0	1	1	0.5
			C.MANDATORY COURSE/ACT	IVITY				
10	MC	MC 18	1 Induction Program	0	0	0	0	
Tota	l of Theory, I	Practical &	Mandatory Course/Activity				23	17.5

R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure& Syllabus (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 2ND SEMESTER

			2 nd Semester					
Sl No.	Paper Category	Paper Code	Theo ry	Con	tact Ho	urs /W	Credit Points	
	outogor,		- v	L	T	P	Total	1 011105
			A. THEORY					
1	BS	M 201	Mathematics -II	3	1	0	4	4
2	BS	CH 201/ PH 201	Chemistry - (Gr. B) / Physics – I (Gr. A)	3	0	0	3	3
3	ES	EE 201/ EC 201	Basic Electrical Engineering (Gr. B) / Basic Electronics Engineering (Gr. A)	3	0	0	3	3
4	ES	CS 201	Programming for Problem Solving	3	0	0	3	3
5	ES	ME 201	Engineering Mechanics	3	0	0	3	3
Total o	f Theory						16	16
			B. PRACTICAL					
6	ES	CS291	Programming for Problem Solving Lab & Project	0	0	3	3	1. 5
7	BS	CH 291/ PH 291	Chemistry Lab (Gr. B) / Physics - I Lab (Gr. A)	0	0	3	3	1. 5
8	ES	EE 291/ EC 291	Basic Electrical Engineering Lab (Gr. B) / Basic Electronics Engineering Lab (Gr. A)	0	0	3	3	1. 5
9	ES	ME 291/ ME 292	Engineering Graphics & Design (Gr B) / Workshop/Manufacturing Practice (Gr-A)	0	0	3	3	1. 5
10	HS	HU 291	Language Lab	0	0	2	2	1
11	PROJ	PR 291	Project-II	0	0	1	1	0. 5
12	PROJ*	PR 292	Innovative Activities-I	0	0	0	0	0. 5
			C.MANDATORY COURSE/ACTIVITY					
13	MC	MC 281	NSS/ NCC/ Physical Activities/Meditation & Yoga/Photography/ Nature Club	0	0	0	3	
Total o	f Theory, Pr	actical & Mand	latory Course/Activity				34	24

R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure& Syllabus (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 3RD SEMESTER

			3 rd Semester					
Sl No	Paper Category	Paper Code	Theory	C	ontact H	ours /W	eek	Credit Points
110	Cutegory			L	Т	P	Total	Tomes
			A. THEORY					
1	BS	M(BME)301	Mathematics -III	3	1	0	4	4
2	ES	EE(BME)301	Circuit Theory	3	0	0	3	3
3	PC	BME 301	Engineering Physiology & Anatomy	3	0	0	3	3
4	PC	BME 302	Biophysical Signals & System	3	0	0	3	3
5	PC	BME 303	Biomechanics-I (Solid)	3	0	0	3	3
Total	of Theory	I					16	16
			B. PRACTICAL		L			
6	ES	EE(BME)391	Circuit Theory Lab	0	0	2	2	1
7	PC	BME 391	Engineering Physiology & Anatomy Lab	0	0	3	3	1.5
8	PC	BME 392	Biophysical Signals & System Lab	0	0	2	2	1
10	PROJ	PR 391	Project-III	0	0	2	2	1
11	PROJ*	PR 392	Innovative Activities-II	0	0	0	0	0.5
			C.MANDATORY COURSE/A	CTIVITY	7		1	I.
12	MC	MC381	Behavioural& Interpersonal skills	0	0	3	3	
Total	of Theory, P	ractical & Manda	atory Course/Activity				28	21

R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure& Syllabus (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 4TH SEMESTER

			4 th Semester					
Sl	Paper	Paper Code	Theo	Con	tact Ho	urs /W	eek	CreditP
No	Category		ry	L	Т	P	Total	oints
			A. THEORY				20002	
1	BS	PH(BME) 401	Physics-II	3	0	0	3	3
2	PC	BME 401	Biomaterials	3	0	0	3	3
3	PC	BME 402	Biomechanics-II (Fluid)	3	0	0	3	3
4	ES	EC(BME) 402	Analog & Digital Electronics	3	0	0	3	3
5	HU	HU 402	Economics for Engineers	2	0	0	2	2
Total	of Theory						14	14
			B. PRACTICAL					
6	BS	PH(BME) 491	Physics-II Lab	0	0	2	2	1
7	PC	BME 491	Biomaterials & Biomechanics Lab	0	0	3	3	1.5
8	ES	EC(BME) 492	Analog & Digital Electronics Lab	0	0	2	2	1
9	PROJ	PR 491	Project-IV	0	0	2	2	1
11	PROJ*	PR 492	Innovative Activities-III	0	0	0	0	0.5
			C.MANDATORY COURSE/ACTIVITY				1	1
10	MC	MC 401	Environmental Science	3	0	0	3	
Total	of Theory, I	Practical & Mand	atory Course/Activity				26	19

R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure& Syllabus (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 5TH SEMESTER

			5 th Semester					
Sl No.	Paper Category	Paper Code	Theory		Contac /W	ct Hou Veek	rs	Credit Points
				L	T	P	Total	
			A. THEORY					
1	PC	BME 501	Biomedical Instrumentation	3	0	0	3	3
2	PC	BME 502	Biosensors & Transducers	3	0	0	3	3
3	PC	BME 503	Medical Imaging Techniques	3	0	0	3	3
4	HU	HU 504	Principles of Management	2	0	0	2	2
5	PE	BME504A BME 504B BME504C	Biophysics & Biochemistry Bio-nanotechnology Computers in Medicine	3	0	0	3	3
6	OE	BME 505A BME505B BME505C	Data Structure & Algorithm Database Management System Control Engineering	3	0	0	3	3
Total	of Theory						17	17
			B. PRACTICAL					
7	PC	BME 591	Biomedical Instrumentation Lab	0	0	3	3	1.5
8	PC	BME 592	Biosensors & Transducers Lab	0	0	2	2	1
9	OE	BME595A BME595B BME595C	Data Structure & Algorithm Lab Database Management System Lab Control Engineering Lab	0	0	2	2	1
10	PROJ	PR 591	Project-V	0	0	2	2	1
11	PROJ*	PR 592	Innovative Activities-IV	0	0	0	0	0.5
		'	C.MANDATORY COURSE/ACTIVITY					
12	MC	MC501	Constitution of India	3	0	0	3	
Total	of Theory, Pi	ractical & Ma	ndatory Course/Activity				29	22

R18 B.TECH BME

Department: Biomedical Engineering Curriculum Structure & Syllabus (Effective from 2018-19 admission batch)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 6TH SEMESTER

			6 th Semester					
Sl	Paper	Paper Code		Cont	act Ho	urs/W	eek	Credit
No	Category		ory	L	Т	P	Total	Points
•			A. THEORY	L			Total	
1	PC	BME 601	Biomedical Digital Signal Processing	3	0	0	3	3
2	PC	BME 602	Analytical & Diagnostic Equipments	3	0	0	3	3
3	PC	BME 603	Advanced Imaging Systems	3	0	0	3	3
4	PE	BME604A BME 604B BME604C	Bioelectrical &Bioelectronic Measurement Communication Systems & Biotelemetry Medical Informatics	3	0	0	3	3
5	OE	BME 605A BME605B BME605C	Microprocessors & Microcontrollers VLSI & Embedded System Soft Computing	3	0	0	3	3
Total	of Theory						15	15
			B. PRACTICAL					
6	PC	BME 691	Biomedical Digital Signal Processing Lab	0	0	3	3	1.5
7	PC	BME 692	Biomedical Equipments Lab	0	0	3	3	1.5
8	OE	BME695A BME695B BME 695C	Microprocessors & Microcontrollers VLSI & Embedded System Lab Soft Computing Lab	0	0	3	3	1.5
9	PROJ	PR 691	Project-VI	0	0	2	2	1
10	PROJ*	PR 692	Innovative Activities-V	0	0	0	0	0.5
			C.MANDATORY COURSE/ACTIVITY	1				
10	MC	MC 681	Group Discussion	0	0	3	3	
Total	of Theory, P	Practical & Ma	indatory Course/Activity				29	21

R18 B.TECH BME

Department: Biomedical Engineering *Curriculum Structure& Syllabus* (*Effective from 2018-19 admission batch*)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 7TH SEMESTER

			7 th Semester					
Sl No.	PaperC ategory	PaperCode	Theory	Cont	actHou	ırs/Wee	ek	Credit Points
1100				L	T	P	Total	
			A. THEORY					
1	PC	BME701	TherapeuticEquipments	3	0	0	3	3
2	HU	HU701	Values&EthicsinProfession	2	0	0	2	2
3	PC	BME702	MedicalImageProcessing	3	0	0	3	3
4	PE	BME703A BME 703B BME703C	BiomedicalHazards& Safety BiologicalControlSystem Bioheat& MassTransfer	3	0	0	3	3
5	OE	BME 704A BME704B BME 704C	ArtificialNeuralNetworks ComputationalMethodsforBiomolecules LaserandFiberOptics inMedicine	3	0	0	3	3
Total	of Theory						14	14
			B.PRACTICAL					
6	PC	BME791	Medical Instruments&SystemsLab	0	0	3	3	1.5
7	PC	BME792	MedicalImageProcessingLab	0	0	3	3	1.5
8	PROJ	PR791	Project VII	0	0	5	5	2.5
	PROJ*	PR792	InnovativeActivities-VI	0	0	0	0	0.5
			C.MANDATORYCOURSE/ACTIVITY					
9	MC	MC701	EssenceofIndianKnowledgeTradition	3	0	0	3	
Total	ofTheory,Pi	ractical &Mand	latoryCourse/Activity				28	20

R18 B.TECH BME

Department: Biomedical Engineering *Curriculum Structure & Syllabus* (*Effective from 2018-19 admission batch*)

Under Autonomy (GR A: ECE, EE, EIE, BME; GR B: CSE, IT, ME, CE, FT)

CURRICULUM AND DETAILED SYLLABUS FOR 8TH SEMESTER

			8 th Semester					
Sl No.	PaperC ategory	PaperCode	The ory	Cont	actHo	urs/W	eek	Credit Points
1100			•	L	T	P	Total	
			A. THEORY					
1	PC	BME801	Artificial Organ & Rehabilitation Engineering	3	0	0	3	3
2	PE	BME 802A BME 802B BME 802C	Radiotherapy & Nuclear Medicine Modeling of Physiological System BioMEMs	3	0	0	3	3
3	PE	BME803A BME 803BBME8 03C	BiomedicalEquipment Management Tissue EngineeringTelemedicin e	3	0	0	3	3
4	OE	BME 804A BME 804B BME 804C	Hospital Engineering & Management Drug Delivery System Medical Robotics & Automation	3	0	0	3	3
Total	of Theory						12	12
			B.PRACTICAL					
5	PROJ	PR891	Project VIII	0	0	7	7	3.5
	C. MANDATORY COURSE/ACTIVITY							
6	MC	MC881	Grand Viva	0	0	0	0	
Total	ofTheory,Pr	actical &Man	latoryCourse/Activity				19	15.5

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

First Year First Semester

Sl.	Category	Course	Course Title		Hou	ırs per	week		Credits	Ma	rks
No.		Code		L	T	P	S	Total		Int.	Ext.
	A. THEORY										
1	Basic Science course	PH101	Physics - I	3	0	0	0	3	3	30	70
2	Basic Science course	M101	Mathematics - I	4	0	0	0	4	4	30	70
3	Humanities and Social Sciences including Management courses	HSMC101	Professional Communication	2	0	0	0	2	2	30	70
	B. PRACTICAL										
4	Basic Science course	PH191	Physics - I Lab	0	0	3	0	3	1.5	40	60
5	Engineering Science Course		Workshop & Manufacturing Practices Lab	0	0	3	0	3	1.5	40	60
6	PROJECT	PR191	Theme Based Project - I	0	0	0	1	1	0.5	100	0
7	PROJECT	PR192	Skill Development - I: Soft Skill	0	0	0	1	1	0.5	100	0
	C. MANDATORY A	CTIVITIES	/ COURSES								
8	Mandatory Course	MC181	Induction Program	0	0	0	0	0	0		
		I	TOTAL CREDI	T		1	1	ı	13.0		

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch] L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P =0.5 Cr]

First Year Second Semester

Sl. No.	Category	Course Course Title Code			Hou	ırs per	week		Credits		arks
110.		Couc		L	Т	P	S	Total		Int.	Ext.
	A. THEORY										
1	Basic Science course	CH201	Chemistry - I	3	0	0	0	3	3	30	70
2	Basic Science course	M201	Mathematics - II	4	0	0	0	4	4	30	70
3	Engineering Science Course	EE201	Basic Electrical Engineering	3	0	0	0	3	3	30	70
4	Engineering Science Course	CS201	Programming for Problem Solving	3	0	0	0	3	3	30	70
	B. PRACTICAL	<u>'</u>									
5	Basic Science course	CH291	Chemistry - I Lab	0	0	3	0	3	1.5	40	60
6	Humanities and Social Sciences including Management courses	HSMC291	Professional Communication Lab	0	0	2	0	2	1.0	40	60
7	Engineering Science Course	EE291	Basic Electrical Engineering Lab	0	0	3	0	3	1.5	40	60
8	Engineering Science Course	ME292	Engineering Graphics and Design Lab	0	0	3	0	3	1.5	40	60
9	Engineering Science Course	CS291	Programming for Problem Solving Lab	0	0	3	0	3	1.5	40	60
10	PROJECT	PR291	Theme based Project - II	0	0	0	1	1	0.5	100	0
11	PROJECT	PR292	Skill Development - II: Life Skill	0	0	0	1	1	0.5	100	0
	C. MANDATOR	Y ACTIVIT	TIES / COURSES								
12	Mandatory Course	MC281	NSS/Physical Activities / Meditation and Yoga / Photography / Nature Club	0	0	0	3	3	0	100	0
	TOTAL CR	EDIT							21.0		

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

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Second Year Third Semester

Sl.	Category	Course Code	Course Title	Hours per week					Credits	Ma	arks
No.				L	T	P	S	Total		Int.	Ext.
	A. THEORY					1					
1	Basic Science course	M(BME)301	Mathematics - III	3	0	0	0	3	3	30	70
2	Engineering Science Course	EC(BME)301	Analog Electronics and Circuit Theory	3	0	0	0	3	3	30	70
3	PC Course	BME301	Human Anatomy and Physiology	3	0	0	0	3	3	30	70
4	PC Course	BME302	Biophysical Signals and Systems	3	0	0	0	3	3	30	70
5	PC Course	BME303	Biomechanics - I	3	0	0	0	3	3	30	70
	Humanities and Social Sciences including Management courses	HSMC303	Universal Human Values 2: Understanding Harmony	3	0	0	0	3	3	30	70
	B. PRACTICAL										
7	Engineering Science Course	ES391	Numerical Methods Lab	0	0	3	0	3	1.5	40	60
8	Engineering Science Course	EC(BME)391	Analog Electronics and Circuit Theory Lab	0	0	3	0	3	1.5	40	60
9	PC Course	BME391	Human Anatomy and Physiology Lab	0	0	3	0	3	1.5	40	60
10	PC Course	BME392	Biophysical Signals and Systems Lab	0	0	3	0	3	1.5	40	60
11	PROJECT	PR391	Theme based Project - III	0	0	0	1	1	0.5	100	0
12	PROJECT	PR392	Skill Development - III: Technical Seminar Presentation	0	0	0	1	1	0.5	100	0
	C. MANDATORY A	CTIVITIES /	COURSES								
13	MC	MC301	Environmental Science	3	0	0	0	3	0	30	70
	TOTAL CREDIT V	VITHOUT MO	OCS COURSES			1	l		25.0		
	D.MOOCS COURSI	ES**									
14	MOOCS COURSES	HM301	MOOCS COURSE - I	3	1	0	0	4	4		
	TOTAL CREDIT V	VITH MOOCS	COURSES				•		29.0		

^{**} MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

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Second Year Fourth Semester

Sl.	Category	Course Code	Course Title	Ho	urs p	er we	ek		Credits	Marks	
No.				L	T	P	S	Total	-	Int.	Ext.
	A. THEORY										
1	Basic Science course	PH(BME)401	Physics - II	3	0	0	0	3	3	30	70
2	Engineering Science Course	EC(BME)402	Digital Electronics and Devices	3	0	0	0	3	3	30	70
3	PC Course	BME401	Biomaterials	3	0	0	0	3	3	30	70
4	PC Course	BME402	Biomechanics - II	3	0	0	0	3	3	30	70
5	PC Course	BME403	Bioelectrical and Bioelectronic Measurement	3	0	0	0	3	3	30	70
6	Humanities and Social Sciences including Management courses	HSMC402	Gender Culture and Development	2	0	0	0	2	2	30	70
	B. PRACTICA	AL						•			
7	Engineering Science course	PH(BME)491	Physics - II Lab	0	0	2	0	2	1	40	60
8	Engineering Science Course	EC(BME)492	Digital Electronics and Devices Lab	0	0	3	0	3	1.5	40	60
9	PC Course	BME491	Biomaterials Lab	0	0	3	0	3	1.5	40	60
10	PC Course	BME492	Biomechanics Lab	0	0	3	0	3	1.5	40	60
11	PROJECT	PR491	Theme based Project IV	0	0	0	1	1	0.5	100	0
12	PROJECT	PR492	Skill Development - IV: Soft Skill and Aptitude - I	0	0	0	1	1	0.5	100	0
	C. MANDAT	ORY ACTIVIT	TIES / COURSES								
13	MC	MC481	Environmental Protection Initiatives or Learning an Art Form [vocal or instrumental, dance, painting, clay modeling, etc.]	0	0	0	3	3	0	100	0
		ТО	TAL CREDIT WITHOUT MO	OCS	cou	RSE	S		23.5		
	D.MOOCS CO	URSES									
14	MOOCS COURSES	HM401	MOOCS COURSE - II	3	1	0	0	4	4		
ТОТ	AL CREDIT WI	TH MOOCS C	COURSES						27.5		
					1	1		·			·

^{**} MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

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Third Year Fifth Semester

Sl.	Category	Course	Course Title]	Hour	s per	weel	ζ.	Credits	M	arks
No.		Code		L	Т	P	S	Total		Int.	Ext.
	A. THE	ORY			_			10001		1110	DAV.
1	Humanities and	HSMC505	Principles of Management	2	0	0	0	2	2	30	70
	Social Sciences										
	including										
	Management										
	courses	D) (E501	Di ti ti i			0		2	2	20	7.0
2	PC Course	BME501	Biomedical Instrumentation	3	0	0	0	3	3	30	70
3	PC Course	BME502	Biosensors and Transducers	3	0	0	0	3	3	30	70
4	PC Course	BME503	Medical Imaging Systems - I	3	0	0	0	3	3	30	70
5	PE Course	BME504A	Communication Systems and	3	0	0	0	3	3	30	70
			Biotelemetry								
		BME504B	Modelling of Physiological Systems								
		BME504C	Biomedical Informatics					_	_		
6	OE Course	BME505A	Data Structure and Algorithm	3	0	0	0	3	3	30	70
		BME505B	VLSI and Embedded System								
	I = ·	BME505C	Measurement and Control System								
	B. PRAC										
7	PC Course	BME591	Biomedical Instrumentation Lab	0	0	3	0	3	1.5	40	60
8	PC Course	BME592	Biosensors and Transducers Lab	0	0	3	0	3	1.5	40	60
9	OE Course	BME595A	Data Structure and Algorithm Lab	0	0	3	0	3	1.5	40	60
		BME595B	VLSI and Embedded System Lab								
		BME595C	Measurement and Control								
			System Lab								
10	PROJECT	PR591	Minor Project - I	0	0	0	2	2	1	100	0
11	PROJECT	PR592	Skill Development - V:	0	0	0	1	1	0.5	100	0
			Soft Skill and Aptitude - II								
,	C. MANI	DATORY AC	CTIVITIES / COURSES		•						
12	MC	MC501	Constitution of India	2	0	0	0	2	0	30	70
	T	OTAL CREI	DIT WITHOUT MOOCS COURSES					_	23.0		
	D. MOOC	CS COURSES	5 **								
13	MOOCS COURSES	HM501	MOOCS COURSE - III	3	1	0	0	4	4		
	COURSES	757.4	OTAL CREDIT WITH MOOCE CO.	LIDG	EC				27.0		
L		10	OTAL CREDIT WITH MOOCS CO	UKS.	E2				27.0		

^{**} MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

Third Year Sixth Semester

Sl.	Category	Course	Course Title	Hours per week			ek	Credits	Ma	Marks	
No.		Code		L	T	P	S	Total		Int.	Ext.
	A. THEORY										
1	Humanities and Social Sciences including Management courses	HSMC604	Economics for Engineers	2	0	0	0	2	2	30	70
2	PC Course	BME601	Analytical and Diagnostic Equipment	3	0	0	0	3	3	30	70
3	PC Course	BME602	Biosignal Processing	3	0	0	0	3	3	30	70
4	PC Course	BME603	Medical Imaging Systems - II	3	0	0	0	3	3	30	70
5	PE Course	BME604B BME604C	Biophysics and Biochemistry Nanobiotechnology Tissue Engineering	3	0	0	0	3	3	30	70
6	OE Course	BME605B BME605C	Database Management System Microprocessor and Microcontroller Soft Computing	3	0	0	0	3	3	30	70
	B. PRACTIC	AL									
7	PC Course	BME691	Analytical and Diagnostic Equipment Lab	0	0	3	0	3	1.5	40	60
9	PC Course	BME692	Biosignal Processing Lab	0	0	3	0	3	1.5	40	60
10	OE Course	BME695A BME695B BME695C	Database Management System Lab Microprocessor and Microcontroller Lab Soft Computing Lab	0	0	3	0	3	1.5	40	60
11	PROJECT	PR691	Minor Project - II	0	0	0	2	2	1	100	0
12	PROJECT	PR692	Skill Development - VI: Soft Skill and Aptitude - III	0	0	0	1	1	0.5	100	0
	C. MANDATO	ORY ACTIV	VITIES / COURSES								
13	MC	MC601	Intellectual Property Right	2	0	0	0	2	0	30	70
	TOTAL CREDIT V	VITHOUT I	MOOCS COURSES						23.0		
	D.MOOCS CO	URSES**									
14	MOOCS COURSES	HM601	MOOCS COURSE - IV	3	1	0	0	4	4		
	TO	OTAL CRE	DIT WITH MOOCS COURSES						27.0		

^{**} MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P =0.5 Cr]

Fourth Year Seventh Semester

Sl. No.	Category	Course Code	Course Title	C	ontac	t Ho	urs /\	Veek	Credits	Mai	rks
110.				L	T	P	S	Total		Int.	Ext.
	A. TH	EORY									
1	PC Course	BME701	Therapeutic Equipment	3	0	0	0	3	3	30	70
2	PE Course	BME702A BME702B BME702C	Medical Image Processing Medical Robotics and Automation Neural Network and Genetic Algorithm	3	0	0	0	3	3	30	70
3	PE Course	BME703A BME703B BME703C	Hospital Engineering and Management BioMEMs and Biomicrofluidics Drug Delivery System	3	0	0	0	3	3	30	70
4	OE Course	BME704A BME704B BME704C	IOT and Telehealth Technology Deep Learning and Machine Learning in Health Care Artificial Intelligence in Clinical Science	3	0	0	0	3	3	30	70
	B. PRA	ACTICAL	S								
5	PC Course	BME791	Therapeutic Equipment Lab	0	0	0	0	3	1.5	40	60
6	PE Course	BME792A BME792B BME792C	Medical Image Processing Lab Medical Robotics and Automation Lab Neural Network and Genetic Algorithm Lab	0	0	3	0	3	1.5	40	60
7	PROJECT	PR791	Major Project - I	0	0	0	0	4	2	100	0
8	PROJECT	PR792*	Industrial Training / Internship	0	0	0	0	0	1	100	0
9	PROJECT	PR793	Skill Development - VII: Seminar and Group Discussion	0	0	1	1	1	0.5	100	0
	C. MA	NDATORY A	ACTIVITIES / COURSES								
10	MC	MC701	Entrepreneurship and Innovation Skill	2	0	0	0	2	0	30	70
			VITHOUT MOOCS COURSES						18.5		
11		OCS COURS		2	1	0		4			
11	MOOCS COURSES	HM701	MOOCS COURSE - V	3	1	0	0	4	4		
	TOTA	L CREDIT W	VITH MOOCS COURSES						22.5		

^{*}Collective Data from 3rd to 6th Semester (Summer/Winter Training during Semester Break and Internship should be done after 5th Semester or 6th Semester). All related certificates to be collected by the training/internship coordinator(s).

^{**} MOOCS COURSES for HONOURS/MINOR Degree are Program specific and to be taken from MOOCS BASKET

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4th Year 2nd Semester

Sl.	Category	Course Code	Course Title		Contac	t Hour	'S		Credits	Marks	
No.		Code		/Week]			
				L	T	P	S	Total		Int.	Ext.
	A. Tl	HEORY									
1	PC Course	BME801	Artificial Organs and Rehabilitation Engineering	3	0	0	0	3	3	30	70
2	PE Course	BME802A BME802B BME802C	Biological Control System Computational Biology Quality Assurance and Regulatory aspects of Medical Equipment	3	0	0	0	3	3	30	70
3	PE Course	BME803A BME803B BME803C	Laser and Fibre Optics in Healthcare Radiotherapy and Nuclear Medicine Troubleshooting and Maintenance of Medical Equipment	3	0	0	0	3	3	30	70
	B. PI	RACTICAL									
4	PROJECT	PR891	Major Project - II	0	0	0	12	12	6	100	0
5	PROJECT	PR892	Grand Viva	0	0	0	0	0	1	100	0
	C. M	ANDATOR	Y ACTIVITIES / COURSES					•			
8	MC	MC801	Essence of Indian Knowledge Tradition	2	0	0	0	2	0	30	70
	TOT	AL CREDI	Γ				•		16		

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

Total:

Total for BN	ME
Without MOOCS	With MOOCS
34.0	34
25.0	29.0
23.5	27.5
23.0	27.0
23.0	27.0
18.5	22.5
16.0	16.0
163	183 (for Honors/minor)

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

Credit Distribution

Subject Category	Subjects	Credit Distribution as per AICTE (%)	Suggested Breakup of Credits (Total 160) as per AICTE	
Humanities and Social Sciences including Management courses	Humanities and Social Science: (i)English (ii)Language / English Lab	5 to 10%	12	12 9+3
(HSMC)	Management courses (i)Principle of Management, (ii)Economics for Engineers (iii)Principles of Management (iv)Values and Ethics in Profession			5.63%
Basic Sciences (BS)	Physics (i)Introduction to Electromagnetic Theory (ii)Introduction toMechanics (iii)Quantum Mechanics forEngineers (iv)Oscillation, Waves andOptics	15 to 20%	25.5	24[IT, BME, ME, CE] 15.00

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

	(v)Semiconductor Optoelectronics (vi)Semiconductor Physics Chemistry and Biology (i)Chemistry — I (Concepts in chemistry for engineering) (ii)Chemistry Laboratory Elective Courses (i)Chemistry-II (Chemical Applications) (ii)Polymer Chemistry (iii)Experiments in Polymer Chemistry Biology Mathematics (i)Mathematics (i)Mathematics (Option 1) Mathematics 1 Mathematics 2 Mathematics 3 (ii)Mathematics (Option 2) (for CSE students)			
Engineering Sciences and Skills (ES)	(i)Workshop / Manufacturing Practice (ii)Drawing / Engineering Graphics and Design, (iii)Basics of Electrical (iv)Computer / Programming for Problem Solving (v)Numerical Methods (vi)Circuit theory	15 to 20%	24	22.5 14.06%

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Professional core courses (PC)	Courses relevant to chosen branch	30 to 40%	48	55.5 34.69%
Professional Elective	Elective courses relevant to chosen specialization/bra nch	10 to 15%	18	19.5 12.19%
Open Elective	Elective Courses from other technical programs and /or emerging subjects: 1.Artificial Intelligence (AI) 2. Internet of Things (IoT) 3. Block Chain 4. Robotics 5. Quantum Computing 6. Data Sciences 7. Cyber Security 8. 3D Printing and Design 9. Virtual Reality (VR)	5 to 10%	8	7.5%

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Project work, seminar and internship in industry or elsewhere	(i)PROJECT (PR91): Project work (ii)PROJECT (PR92): (iii) PROJECT (PR93): (iv)Grand Viva - 1	10 to 15%	15	17.5 10.94 %
Mandatory Courses [Environmen tal Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]	MC Courses: (i)Environmental Science, (ii)Foreign language, (iii)Constitution of India (iv)Behavioral and Interpersonal skills (v)Essence of Indian Knowledge Tradition and others as mentioned in AICTE guidelines MC Activities: (i)Induction Programming (ii)NSS/NCC/Yoga (iii)Technical Lecture Presentation and others as mentioned in AICTE guidelines	No Credit Course	Minimum 2 units per semester min. Max: 28 Units/Pro gram	

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch] L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

Summary

Sub	Credit	%	AICTE %
HSMC	9	5.63	5to10
BSHU	24	15.00	15to20
ES	22.5	14.06	15to20
PC	55.5	34.69	30to40
PE	19.5	12.19	10to15
OE	12	7.50	5to10
Project	17.5	10.94	10to15
	160	100.00	

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P =0.5 Cr]

Professional Electives (It is expected Options in a vertical column would lead to expertise in a specific/allied domain)

	Option 1	Option 2	Option 3	Option 4
Professional Elective I	Communication Systems and Biotelemetry	Modelling of Physiological Systems	Biomedical Informatics	•
Professional Elective II	Biophysics and Biochemistry	Nanobiotechnology	Tissue Engineering	
Professional Elective III	Medical Image Processing	Medical Robotics and Automation	Neural Network and Genetic Algorithm	
Professional Elective IV	Hospital Engineering and Management	BioMEMs and BioMicrofluidics	Drug Delivery System	
Professional Elective V	Biological Control System	Computational Biology	Quality Assurance and Regulatory aspects of Medical Equipment	
Professional Elective VI	Laser and Fiber Optics in Healthcare	Radiotherapy and Nuclear Medicine	Troubleshooting and Maintenance of Medical Equipment	

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch]

L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

Open Electives (It is expected Options in a vertical column would lead to expertise in a specific/allied domain)

	Option 1	Option 2	Option 3	Option 4
Open Elective I	Data Structure and Algorithm	VLSI and Embedded System	Measurement and Control System	
Open Elective II	Database Management System	Microprocessor and Microcontroller	Soft Computing	
Open Elective III	IOT and Telehealth Technology	Deep Learning and Machine Learning in Health Care	Artificial Intelligence in Clinical Science	

Curriculum and Syllabus B.Tech in Biomedical Engineering Under Autonomy

[Effective from 2021-2022 Admission Batch] L - Lecture; T- Tutorial; P- Practical [1L=1Cr, 1T=1Cr, 1P=0.5 Cr]

	Sem	Credit	Option 1	Option 2	Option 3	Option 4
MOOCS	III	4	Related to	Related to	Related to	Related to
COURSE-I			Minor/Honors	Minor/Honors	Minor/Honors	Minor/Honors
MOOCS	IV	4	Related to	Related to	Related to	Related to
COURSE-II			Minor/Honors	Minor/Honors	Minor/Honors	Minor/Honors
MOOCS	V	4	Related to	Related to	Related to	Related to
COURSE-III			Minor/Honors	Minor/Honors	Minor/Honors	Minor/Honors
MOOCS	VI	4	Related to	Related to	Related to	Related to
COURSE-IV			Minor/Honors	Minor/Honors	Minor/Honors	Minor/Honors
MOOCS	VII	4	Related to	Related to	Related to	Related to
COURSE-V			Minor/Honors	Minor/Honors	Minor/Honors	Minor/Honors

^{**}Please define your Honors/Minor programme credit point of 20 to be earned by the student. Related BOS would endorse the selection of these courses followed by the necessary intimation at the Academic Council of the Institute.

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Curriculum Under Autonomy With effective from Academic Year 2023-2024 (R23)

Curriculum Structure B. Tech in Biomedical Engineering

			1st Year 1st	Semester					
Sl No.	Broad	Category	Paper Code	Subject]		onta rs/V	ct Veek	Credit Points
NO.	Category				L	T	P	Total	Points
			A. T	heory					
1	ENGG.	Major	BME101	Introduction to Cell Biology and Organ Systems	3	0	0	3	3
2	SCI	Multidisciplinary Course	M(BME)101	Engineering Mathematics - I	3	0	0	3	3
3	SCI	Multidisciplinary Course	CH(BME)101	Engineering Chemistry	2	0	0	2	2
4	HUM	Ability Enhancement Course	HU101	Professional Communication	2	0	0	2	2
5	HUM	Value Added Course	HU102	HU102 Values and Ethics		0	0	2	2
6	HUM	Value Added Course	HU103	Constitution of India	1	0	0	1	1
			B. Pr	actical					
7	ENGG.	Major	BME191	Introduction to Cell Biology and Organ Systems Lab	0	0	3	3	1.5
8	SCI	Skill Enhancement Course	CH(BME)191	Engineering Chemistry Lab	0	0	2	2	1
9	HUM	Ability Enhancement Course	HU191	Professional Communication Lab	0	0	2	2	1
10	ENGG.	Skill Enhancement Course	ME(BME)191 Workshop and Manufacturing Practices Lab		3	3	1.5		
		Total of The	ory and Practica	al Courses				23	18

			1st Year 2nd	nd Semester					
Sl No.	Broad	Category	Paper Code	Subject	I		ntao rs/W		Credi t
110.	Category				L	T	P	Total	Points
			Α.	Theory					
1	ENGG.	Major	BME201	Bioelectronics	3	0	0	3	3
2	ENGG	Minor	CS(BME)201	Programming for Problem Solving	3	0	0	3	3
3	SCI	Multidisciplinary Course	PH(BME)201	Engineering Physics	3	0	0	3	3
4	SCI	Multidisciplinary Course	M(BME)201	Engineering Mathematics - II	3	0	0	3	3
5	HUM	Value Added Course	HU204	Environmental Science	2	0	0	2	2
6	HUM	Value Added Course	HU205	Indian Knowledge System	1	0	0	1	1
			В. 1	Practical	I	I	I	l	
7	ENGG.	Major	BME291	Bioelectronics Lab	0	0	3	3	1.5
8	ENGG.	Minor	CS(BME)291	Programming for Problem Solving Lab	0	0	3	3	1.5
9	SCI	Skill Enhancement Course	PH(BME)291	Engineering Physics Lab	0	0	3	3	1.5
10	ENGG.	Skill Enhancement Course	ME(BME)291	Engineering Graphics and Design Lab	0	0	3	3	1.5
11	HUM	Ability Enhancement Course	HU291	Skill Development – I: Competencies in Social Skills	0	0	2	2	1
		Total of The	ory and Practi	ical Courses				29	22

			2 nd Year 3 ^r	d Semester					
Sl	Broad	category	Paper Code	Subject]	Co Hou	Credit Points		
No.	Category				L T P		Total	Points	
			A. '	Theory					
1	ENGG.	Major	BME301	Human Anatomy and Physiology	3	0	0	3	3
2	ENGG.	Major	BME302	Biomechanics - I	3	0	0	3	3
3	ENGG.	Minor	EE(BME)301	Circuit Theory and Networks	3	0	0	3	3
4	ENGG.	Minor	M(BME)301	Numerical Methods and Statistics	3	0	0	3	3
5	ENGG.	Minor	EC(BME)301	Analog Electronics	3	0	0	3	3
			В. Р	ractical					
6	ENGG.	Major	BME391	Human Anatomy and Physiology Lab	0	0	3	3	1.5
7	ENGG.	Skill Enhancement Course	EE(BME)391	Circuit Theory and Networks Lab	0	0	2	2	1
8	ENGG.	Minor	M(BME)391	Numerical Methods and Statistics Lab	0	0	2	2	1
9	ENGG	Skill Enhancement Course	EC(BME)391	Analog Electronics Lab	0	0	3	3	1.5
10	HUM	Ability Enhancement Course	HU391	Skill Development – II: Technical seminar Presentation	0	0	2	2	1
Total of Theory and Practical Courses									

			2 nd Year 4 ^t	h Semester					
Sl No.	Broad Category	category	Paper Code	Subject	Contact Hours/Week				Credit Points
					L T P		Total		
			A.	Theory					
1	ENGG.	Major	BME401	Biomaterials	3	0	0	3	3
2	ENGG	Major	BME402	Biomechanics - II	3	0	0	3	3
3	ENGG	Major	BME403	Biophysical Signals and Systems	3	0	0	3	3
4	ENGG.	Minor	PH(BME)401	Medical Physics	2	0	0	2	2
5	ENGG	Minor	EC(BME)402	Digital Electronics and Devices	3	0	0	3	3
			В. І	Practical					
6	ENGG.	Major	BME491	Biomaterials Lab	0	0	3	3	1.5
7	ENGG.	Major	BME492	Biomechanics Lab	0	0	3	3	1.5
8	ENGG.	Major	BME493	Biophysical Signals and Systems Lab	0	0	2	2	1
9	ENGG	Skill Enhancement Course	EC(BME)492	Digital Electronics and Devices Lab	0	0	2	2	1
10	HUM	Ability Enhancement Course	HU491 Skill Development – III: Analytical and Logical Thinking Skills - I		2	1			
		Total of Th	eory and Practic	cal Courses		•		26	20

			3 rd Year 5 ^t	h Semester					
Sl	Broad	category	Paper Code	Subject]		onta rs/V	ict Veek	Credit
No.	Category	Ç Ç		, and the second	L	T	P	Total	Points
			A.	Theory					
1	ENGG	Major	BME501	Biomedical Instrumentation	3	0	0	3	3
2	ENGG	Major	BME502	Biosensors and Transducers	3	0	0	3	3
3	ENGG	Major	BME503	Medical Imaging Systems - I	3	0	0	3	3
			BME504A	Communication Systems and Biotelemetry Bioelectrical and					
4	ENGG	Major	BME504B	Bioelectronics Measurement	3	0	0	3	3
			BME504C	Biomedical Informatics					
			CS(BME)505A	Data Structure and Algorithm					
5	ENGG	Minor	EC(BME)505B	VLSI and Embedded System	3	0	0	3	3
			EE(BME)505C	Measurement and Control System					
			В. Р	Practical					
6	ENGG.	Major	BME591	Biomedical Instrumentation Lab	0	0	2	2	1
7	ENGG.	Major	BME592	Biosensors and Transducers Lab	0	0	2	2	1
		Minor	CS(BME)595A	Data Structure and Algorithm Lab					
8	ENGG		EC(BME)595B	VLSI and Embedded System Lab	0	0	2	2	1
			EE(BME)595C	Measurement and Control System Lab					
9	HUM	Ability Enhancement Course	HU591	Skill Development - IV: Analytical and Logical Thinking Skills - II		0	2	2	1
10	PRJ	Project	BME581	Minor Project - I	0	0	2	2	1
		Total of T	heory and Praction	cal Courses				25	20

			3 rd Year 6	th Semester					
Sl No.	Broad	category	Paper Code	Subject]		onta rs/V	ct Veek	Credit Points
110.	Category				L	T	P	Total	romis
			A.	Theory					
1	ENGG	Major	BME601	Analytical and Diagnostic Equipment	3	0	0	3	3
2	ENGG	Major	BME602	Biosignal Processing	3	0	0	3	3
3	ENGG	Major	BME603	Medical Imaging Systems - II	3	0	0	3	3
			BME604A	Biophysics and Biochemistry					
4	ENGG	Major	BME604B	Nanobiotechnology	3	0	0	3	3
			BME604C	Tissue Engineering					
			CS(BME)605A	Database Management System					
5	ENGG	Minor	EC(BME)605B	Microprocessor and Microcontroller	3	0	0	3	3
			CS(BME)605C	Soft Computing					
			В.	Practical					
6	ENGG	Major	BME691	Analytical and Diagnostic Equipment Lab	0	0	2	2	1
7	ENGG	Major	BME692	Biosignal Processing Lab	0	0	2	2	1
			CS(BME)695A	Database Management System Lab					
8	ENGG	Minor	EC(BME)695B	Microprocessor and Microcontroller Lab	0	0	2	2	1
			CS(BME)695C	Soft Computing Lab					
9	PRJ	Project	BME681	Minor Project - II	0	0	4	4	2
10	PRJ	Internship	BME682	Internship	0	0	0	0	1
Total of Theory and Practical Courses									21

			4th Year 7th	th Semester					
Sl No.	Broad Category	category	Paper Code	Subject]		onta rs/V	ict Veek	Credit Points
110.	Category				L	T	P	Total	Tomis
			A.	Theory					
1	ENGG.	Major	BME701	Therapeutic Equipment	3	0	0	3	3
2	ENGG	Major	BME702	Medical Image Processing	3	0	0	3	3
			BME703A	Hospital Engineering and Management					
3	ENGG	Major	BME703B	BioMEMs and Biomicrofluidics	3	0	0	3	3
			BME703C	Drug Delivery System					
			EC(BME)704A	Laser and Optics in Healthcare					
4	ENGG	Minor	EC(BME)704B	Medical Robotics and Automation	3	0	0	3	3
			CS(BME)704C	Neural Network and Genetic Algorithm					
			CS(BME)705A	IOT and Telehealth Technology					
5	ENGG	Minor	CS(BME)705B	Deep Learning and Machine Learning in Health Care	3	0	0	3	3
			CS(BME)705C	Artificial Intelligence in Clinical Science					
			В. 1	Practical					
6	ENGG	Major	BME791	Therapeutic Equipment Lab	0	0	2	2	1
7	ENGG	Major	BME792	Medical Image Processing Lab	0	0	2	2	1
8	PRJ	Project	BME781	Major Project - I	0	0	6	6	3
9	PRJ	Internship	BME782	Industrial Training/ Internship	0	0	0	0	1
		Total of 7	Theory and Practi	cal Courses				25	21

	4 th Year 8 th Semester										
Sl No.	Broad	category	Paper Code	Subject			ontac rs/W		Credit Points		
NO.	Category		Code		L	T	P	Total	Politis		
				A. Theory							
1	ENGG	Major	BME801 Artificial Organs and Rehabilitation 3 0 0 Engineering		0	3	3				
2	ENGG	Major	BME802	Modelling of Physiological System	3	0	0	3	3		
			BME803A	Biomedical Hazards and Safety							
3	ENGG	Major	BME803B	Radiotherapy and Nuclear Medicine	3	0	0	3	3		
			BME803C	Troubleshooting and Maintenance of Medical Equipment							
			BME804A	Biological Control System							
4	ENGG	Major	BME804B	Computational Biology	3	0	0	3	3		
		J	BME804C	Quality Assurance and Regulatory Aspects of Medical Equipment	J		,	Ü	C		
			В	3. Practical							
5	PRJ	Project	BME881	Major Project - II	0	0	12	12	6		
6	ENGG	Major	BME882	Grand Viva	0	0	0	0	1		
		Total of Th	eory and Pra	actical Courses				24	19		

Total Credit: 162

Credit Distribution

Category	1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester	Total Credit toobtain UG Degree (Category Wise)	Credit Allocation as per NEP to obtain UG Degree	7th Semester	8th Semester	Total Credit (Category Wise)	Credit Allocation as per NEP
Major Course	4.5	4.5	7.5	13	14	14	57.5	60	11	13	81.5	80
Minor Course	-	4.5	10	5	4	4	27.5	24	6	-	33.5	32
Multidisciplinary Course	5	6	-	-	-	-	11	9	-	-	11	9
Ability Enhancement Courses (AEC)	3	1	1	1	1	-	7	8	-	-	7	8
Skill Enhancement Courses (SEC)	2.5	3	2.5	1	-	-	9	9	-	-	9	9
Value Added Courses common for all UG	3	3	-	-	-	-	6	6 to 8	-	-	6	6 to 8
Internship	-	-	-	-	-	1	1	2 to 4	1	-	2	2 to 4
Project	-	-	-	-	1	2	3	-	3	6	12	12
Total Credit (Semester Wise)	18	22	21	20	20	21	122	120	21	19	162	160

Distribution of Courses under Different Categories Major Courses

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Introduction to Cell Biology and Organ Systems	BME101	1 ST	3:0:0	3
2	Introduction to Cell Biology and Organ Systems Lab	BME191	1 ST	0:0:3	1.5
3	Bioelectronics	BME201	2 ND	3:0:0	3
4	Bioelectronics Lab	BME291	2^{ND}	0:0:3	1.5
5	Human Anatomy and Physiology	BME301	3 RD	3:0:0	3
6	Human Anatomy and Physiology Lab	BME391	3 RD	0:0:3	1.5
7	Biomechanics - I	BME302	3 RD	3:0:0	3
8	Biomaterials	BME401	4 TH	3:0:0	3
9	Biomaterials Lab	BME491	4 TH	0:0:3	1.5
10	Biomechanics - II	BME402	4 TH	3:0:0	3
11	Biomechanics Lab	BME492	4 TH	0:0:3	1.5
12	Biophysical Signals and Systems	BME403	4 TH	3:0:0	3
13	Biophysical Signals and Systems Lab	BME493	4 TH	0:0:2	1
14	Biomedical Instrumentation	BME501	5 TH	3:0:0	3
15	Biomedical Instrumentation Lab	BME591	5 TH	0:0:2	1
16	Biosensors and Transducers	BME502	5 TH	3:0:0	3
17	Biosensors and Transducers Lab	BME592	5 TH	0:0:2	1
18	Medical Imaging Systems - I	BME503	5 TH	3:0:0	3
	Communication Systems and Biotelemetry	BME504A			
19	Bioelectrical and Bioelectronics Measurement	BME504B	5 TH	3:0:0	3
•	Biomedical Informatics	BME504C			
20	Analytical and Diagnostic Equipment	BME601	6 TH	3:0:0	3
21	Analytical and Diagnostic Equipment Lab	BME691	6 TH	0:0:2	1
22	Biosignal Processing	BME602	6 TH	3:0:0	3
23	Biosignal Processing Lab	BME692	6 TH	0:0:2	1
24	Medical Imaging Systems - II	BME603	6 TH	3:0:0	3
	Biophysics and Biochemistry	BME604A			
25	Nanobiotechnology	BME604B	6 TH	3:0:0	3
•	Tissue Engineering	BME604C			
	Total credit for Major Courses U	Jpto 3 rd Yea	ır		57.5
26	Therapeutic Equipment	BME701	7 TH	3:0:0	3
27	Therapeutic Equipment Lab	BME791	7 TH	0:0:2	1
28	Medical Image Processing	BME702	7 TH	3:0:0	3
29	Medical Image Processing Lab	BME792	7 TH	0:0:2	1
	Hospital Engineering and Management	BME703A			
30	BioMEMs and Biomicrofluidics	BME703B	7 TH	3:0:0	3

	Drug Delivery System	BME703C			
31	Artificial Organs and Rehabilitation Engineering	BME801	8 TH	3:0:0	3
32	Modelling of Physiological System	BME802	8 TH	3:0:0	3
	Biomedical Hazards and Safety	BME803A			
33	Radiotherapy and Nuclear Medicine	BME803B	8^{TH}	3:0:0	3
	Troubleshooting and Maintenance of Medical Equipment	BME803C			
	Biological Control System	BME804A			
34	Computational Biology	BME804B	8^{TH}	3:0:0	3
	Quality Assurance and Regulatory Aspects of Medical Equipment	BME804C			
35	Grand Viva	BME882	8 TH	0:0:0	1
Total credit for Major Courses Upto 4th Year					

Minor Courses

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Programming for Problem Solving	CS(BME)201	2^{ND}	3:0:0	3
2	Programming for Problem Solving Lab	CS(BME)291	2^{ND}	0:0:3	1.5
3	Circuit Theory and Networks	EE(BME)301	3 RD	3:0:0	3
4	Numerical Methods and Statistics	M(BME)301	3 RD	3:0:0	3
5	Numerical Methods and Statistics Lab	M(BME)301	3 RD	0:0:2	1
6	Analog Electronics	EC(BME)301	3 RD	3:0:0	3
7	Medical Physics	PH(BME)401	4 TH	2:0:0	2
8	Digital Electronics and Devices	EC(BME)402	4 TH	3:0:0	3
	Data Structure and Algorithm	CS(BME)505A	5 TH	3:0:0	
9	VLSI and Embedded System	EC(BME)505B			3
	Measurement and Control System	EE(BME)505C			
	Data Structure and Algorithm Lab	CS(BME)595A	5 TH		
10	VLSI and Embedded System Lab	EC(BME)595B		0:0:2	1
	Measurement and Control System Lab	EE(BME)595C			
	Database Management System	CS(BME)605A		3:0:0	
11	Microprocessor and Microcontroller	EC(BME)605B	6 TH		3
	Soft Computing	CS(BME)605C			
	Database Management System Lab	CS(BME)695A			
12	Microprocessor and Microcontroller Lab	EC(BME)695B	6 TH	0:0:2	1
	Soft Computing Lab	CS(BME)695C			
	Total Credit for Minor Course	es Upto 3 rd Yea	ır		27.5
	Laser and Optics in Healthcare	EC(BME)704A			
13	Medical Robotics and Automation	EC(BME)704B	7 TH	3:0:0	3
	Neural Network and Genetic Algorithm	CS(BME)704C			

Total Credit for Minor Courses Upto 4th Year						
	Artificial Intelligence in Clinical Science	CS(BME)705C				
14	Deep Learning and Machine Learning in Health Care	CS(BME)705B	7 TH	3:0:0	3	
	IOT and Telehealth Technology	CS(BME)705A				

Multidisciplinary Courses

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Engineering Mathematics - I	M(BME)101	1 ST	3:0:0	3
2	Engineering Chemistry	CH(BME)101	1 ST	2:0:0	2
3	Engineering Physics	PH(BME)201	2^{ND}	3:0:0	3
4	Engineering Mathematics - II	M(BME)201	2^{ND}	3:0:0	3
Total Credit for Multidisciplinary Courses Upto 3rd Year/4th Year					11

Ability Enhancement Courses

Sl.	Name of the Course	Course Code	Semester	L:T:P	Credit
No.					
1	Professional Communication	HU101	1 ST	2:0:0	2
2	Professional Communication Lab	HU191	1 ST	0:0:2	1
3	Skill Development – I: Competencies in Social Skills	HU291	2 ND	0:0:2	1
4	Skill Development – II: Technical seminar Presentation	HU391	3 RD	0:0:2	1
5	Skill Development – III: Analytical and Logical Thinking Skills - I	HU491	4 TH	0:0:2	1
6	Skill Development - IV: Analytical and Logical Thinking Skills - II	HU591	5 TH	0:0:2	1
Total Credit for Ability Enhancement Courses Upto 3rd Year/4th Year					

Skill Enhancement Courses

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Engineering Chemistry Lab	CH(BME)191	1 ST	0:0:2	1
2	Workshop and Manufacturing Practices Lab	ME(BME)191	1 ST	0:0:3	1.5
3	Engineering Physics Lab	PH(BME)291	2 ND	0:0:3	1.5
4	Engineering Graphics and Design Lab	ME(BME)291	2 ND	0:0:3	1.5
5	Circuit Theory and Networks Lab	EE(BME)391	3 RD	0:0:2	1
6	Analog Electronics Lab	EC(BME)391	3 RD	0:0:3	1.5
7	Analog Electronics Lab	EC(BME)492	4 TH	0:0:2	1
Total Credit for Skill Enhancement Courses Upto 3rd Year/4th Year					9

Value Added Courses

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Values and Ethics	HU102	1 ST	2:0:0	2
2	Constitution of India	HU103	1 ST	1:0:0	1
3	Environmental Science	HU204	2 ND	2:0:0	2
4	Indian Knowledge System	HU205	2^{ND}	1:0:0	1
Total Credit for Value Added Courses Upto 3rd Year/4th Year					6

Internship

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Internship	BME682	6 TH	0:0:0	1
2	Industrial Training/ Internship	BME782	7 TH	0:0:0	1
Total Credit for Internship Upto 3rd Year/4th Year					2

Project

Sl. No.	Name of the Course	Course Code	Semester	L:T:P	Credit
1	Minor Project - I	BME581	5 TH	0:0:2	1
2	Minor Project - II	BME681	6 TH	0:0:4	2
3	Major Project - I	BME781	7 TH	0:0:6	3
4	Major Project - II	BME881	8 TH	0:0:12	6
Total Credit for Project Upto 3rd Year/4th Year					12

Mandatory Additional Requirements (MAR)

as per MAKAUT

Dated: 04.12.2023

Mandatory Additional Requirements (MAR) Activity List w.e.f. 2023-2024

Activity List w.c.i. 2023-2024						
A	ctivity	Points per	Permissible			
		Activity	Points (max)			
1.	. MOOCS (SWAYAM/NPTEL/Spoken Tutorial/any technical, non-tech		r course)			
a)	For 12 weeks duration/40 Hours	20				
b)	For 8 weeks duration/30 Hours	15	40			
c)	For 4 weeks duration/20 Hours	10	.0			
d)	For 2 weeks duration/10 Hours	5				
2.	Tech Fest/Fest/Teachers Day/Fresher's Welcome					
a)	Organizer	5	10			
b)	Participant	3	6			
	Rural Reporting	5	10			
	Tree plantation and Up-keeping (per tree)	1	10			
5.	Relief/Charitable Activities					
a)	Collection of fund/ materials for the Relief Camp or	5				
	Charitable Trusts		40			
b)	To be a part of the Relief Work Team	20				
	Participation in Debate/Group Discussion/Workshop/Tech					
_	uiz/Music/Dance/Drama/Elocution/Quiz/Seminar/Painting/	10	20			
	ny Performing Arts/Photography/Film Making/					
	Publication in News Paper, Magazine, Wall Magazine &	10	20			
	logs					
	Research Publication (per publication)	15	30			
-	Innovative Projects (other than course curriculum)	30	60			
10	Blood donation	8	16			
	Blood Donation Camp Organization	10	20			
1.	1. Sports/Games/Adventure Sports/Trekking/Yoga Camp					
a)	Personal Level	10	20			
b)	College level	5	10			
c)	University Level	10	20			
c)	District Level	12	24			
e)	State Level	15	30			
f)	National/International Level	20	20			
-	2. Activities in a Professional Society/Student Chapter	10	20			
	3. Relevant Industry Visit & Report/Hotel-Event Management	10	20			
	raining & Report (Minimum 3 days with submitted report)	10	20			
	4. Community Service & Allied Activities like: Caring for the					
	enior Citizens, Under-privileged/Street Children/ Animal	10	20			
Care etc/ Training to Differently Able						
	15. Self-Entrepreneurship Programm					
a)	To organise entrepreneurship programmes and workshops	10	20			
b)	To take part in entrepreneurship workshop and get certificate	5	10			
c)	Video film making on entrepreneurship	10	20			
d)	Submit business plan on any project	10	20			
e)	To work for start-up/as entrepreneur	20	40			

Massive Open Online Courses (MOOCs) scheme at MAKAUT, WB (Applicable from the session 2020-21)

All India Council for Technical Education (AICTE) has introduced Model Curriculum for Bachelor of Technology programme with 160 credits in the entire programme of 4 years, and additional 20 credits will be required to be achieved through Massive Open Online Courses (MOOCs) from different platform for the degree of Bachelor of Technology with Honours. These additional 20 credits will have to be acquired with online courses (MOOCs) as per AICTE. Students of B Tech program will have to complete additional 20 credits through MOOCs within 4 years of time. 16 credit points is applicable for 3 year UG programs. This creates an excellent opportunity for students to acquire the necessary additional skill set for employability through massive open online courses where the rare expertise of world famous experts from academics and industry are available. Maulana Abul Kalam Azad University of Technology, West Bengal (MAKAUT, WB) has thus decided to introduce AICTE model curriculum for its B.Tech Programmes and allow students to choose courses from any established online platform as per following revised guidelines from academic year 2020-21.

GUIDELINES FOR MOOCS

MOOCs (Massive Open Online Courses) have been inducted in University curriculum and academic activities in the following ways:

- 1. MOOCs for Honours Degree at Undergraduate Level.
- 2. MOOCs for mandatory Coursework of Research Scholars for Ph.D. degree
- 3 MOOCs are also used for credit transfer as equivalent to theory courses of Curriculum under recommendation of BoS.
- 4. MOOCs for Mandatory Additional Requirements (MAR)

MOOCs for B.Tech Honours Degree

For B.Tech Honours Degree, a B.Tech student will have to earn 20 credits from MOOCs from any established MOOCs platform addition to 160 credits for B.Tech degree.

The total of 20 credits that is required to attain eligibility for B.Tech Honours degree is distributed over four years in the following way:

1st year: 4-8 credits 2ndyear: 4-8 credits 4thyear: 4 credits

A student of first year has to cover courses from at least three skills:

- 1. Computer Programing with Python /R
- 2. Softskill3. Ethics

Students of all streams are to be equipped with Programming skill in the language that is in high demand worldwide in the first year itself so that they can apply this skill in the subsequent

semesters in their different areas including their core area of study.

Soft skill is very essential for grooming of the student and student must be exposed to it in the very beginning of the 4 years long program.

Ethics is something that one should practice. Students are to be made aware of the ethics right in the beginning of the 4 years long program so that they can practice at least some of the ethical norms as applicable to Institutional environment and society, and be prepared to practice ethics in their working life.

All of the MOOCs courses are to be taken any MOOCs platform as per following scheme of credit points. There would not be any concept of fixed basket anymore. However, <u>during choosing courses in the online platform students would essentially</u> avoid the courses taught/offered through the curriculum in the offline / class room <u>mode</u>.

MOOCs Curriculum for B. Tech BME Hons.

Sl No.	Course Name	Year	Duration	Credit
1	Biomechanics of Joints and Orthopaedic Implants	2 ND	12W	3
2	Transport Phenomena in Biological Systems	2 ND	12W	3
3	Mathematical Aspects of Biomedical Electronic System Design	2 ND	12W	3
4	Fabrication Techniques for MEMs-based sensors : clinical perspective	2 ND	12W	3
5	Physics of Biological Systems	2 ND	12W	3
6	Biomechanics	2 ND	12W	3
7	Medical Biomaterials	2 ND	8W	2
8	Signals & Systems	2 ND	12W	3
9	User-centric Computing for Human-Computer Interaction	2 ND	8W	2
10	Biomedical Signal Processing	2 ND	12W	3
11	BioMEMS and Microfluidics	3 RD	8W	2
12	Drug Delivery: Principles and Engineering	3 RD	12W	3
13	Electrocardiogram- Interpretation and application in clinical practice	3 RD	4W	1
14	Design & Implementation of Human- Computer Interfaces	3 RD	12W	3
15	Bioengineering: An Interface with Biology and Medicine	3 RD	8W	2
16	Computational System Biology	3 RD	12W	3
17	Bioinformatics: Algorithms and Applications	3 RD	12W	3
18	Embedded System Design	3 RD	12W	3
19	Medical Image Analysis	3 RD	4W	1
20	Artificial Intelligence- Knowledge Representation & Reasoning	3 RD	12W	3
21	Organ Printing	4 TH	8W	2
22	Computer Aided Drug Design	4 TH	8W	2
23	Medical Image Analysis	4 TH	12W	3
24	Digital Image Processing	4 TH	12W	3