B.Tech in Biomedical Engineering

Proposed draft Curriculum

	Course code	Course name	Category	Credits	Prereq
Sem-1	CY1018	Environmental Chemistry	BS	2	None
	EP1108	Modern Physics	BS	2	None
	ID1063	Introduction to Programming	BE	3	None
	ID<em>	Engineering Mechanics	BE	3	None
	LAxxxx	English Communication	SS	2	None
	LAxxxx	Personality Development	SS	1	None
	MA1110	Calculus - I	BS	1	None
	MA1220	Calculus - II	BS	1	None
			Sem Total	15	

	Course code	Course name	Category	Credits	Prereq
Sem-2	BM1000	Physio-anatomy-I	BS	2	None
	BM1030	Bioengineering[es]	Core	2	None
	BO1010	Life Science	BS	1	None
	EP1208	Electricity & magnetism	BS	2	None
	ID1054	Digital fabrication	BE	2	None
	IDxxxx	Entrepreneurship	SS	1	None
	IDxxxx	Artificial intelligence	BE	1	None
	ID<ee>	Basic Electrical Engineering	BE	3	None
	MA1140	Elementary Linear algebra	BS	1	None
	MA1150	Differential equations	BS	1	None
		Electives		1	
			Sem Total	17	

	Course code	Course name	Category	Credits	Prereq
Sem-3	BM1010	Physio-anatomy-II	Core	2	BM1000
	BM2013	Analog and integrated circuits	Core	3	ID<ee>
	BM2043	Algorithms and data structures lab	Core	2	ID2230
	BM2053	Mathematical models & systems biology[es]	Core	2	BM1000; BM1010
	ID2230	Data structures and applications	BE	3	None
	MA2110	Introduction to Probability	BS	1	None
		Electives		3	
			Sem Total	16	

	Course code	Course name	Category	Credits	Prereq
Sem-4	BM2000	Control systems	Core	1	None
	BM2003	Introduction to embedded systems	Core	3	BM2013
	BM2023	Basic Bioinformatics	Core	2	BM1000; BM1010
	BM3030	Medical nanotech-I	Core	2	BM1000; BM1010
	BM3090	Biomedical imaging	Core	3	None
	MA2140	Introduction to Statistics	BS	1	None
		Electives		3	
			Sem Total	15	

	Course code	Course name	Category	Credits	Prereq
Sem-5	BM3000	Natural intelligence, Foundations of	Core	3	BM2033; BM1000; BM1010
	BM3023	Cell Technology	Core	3	BM1000; BM1010
	BM3040	Introduction to Biomechanics	Core	2	BM1000; BM1010
	BM5013	Sensors & transducers in healthcare	Core	2	BM2013; BM2003
	BM5090	Biomaterials-1	Core	2	BM1000; BM1010
	ID<sp>	Linear Systems and Signal Processing	BE	3	None
		Electives		2	
			Sem Total	17	

	Course code	Course name	Category	Credits	Prereq
Sem-6		Internship / Electives		6	required CGPA
		Electives		*9*	
			Sem Total	15	

	Course code	Course name	Category	Credits	Prereq
Sem-7	BM5023	Biomedical devices	Core	2	BM5013
		Electives		15	
			Sem Total	17	

	Course code	Course name	Category	Credits	Prereq
Sem-8	BM4000	Regulatory processes and bioethics	Core	2	BM5023
	BM4015	Capstone Project	Core	3	15 credits of Elective basket
	BM6246	Clinical immersion & Biodesign	Core	2	BM1030; BM5023
		Electives		9	
			Sem Total	16	

Total (All Sems) **128**

Summary of Credits

Core credits	43
BE credits	18
BS credits	15
SS credits	4

LA / CA electives	8
Free Electives	10
Dept. Electives	30
Total	128

<Course Name>[es] **Offered to Engineering Science**

Dept. Elective baskets

A total of 30* departmental electives must be chosen, of which at least 22 credits must come from a single basket. The remaining credits may be chosen from other baskets

*** Students opting for internship during 6th Semester to choose 24 electives of which 22 credits must come from a single basket**

Bio-imaging & sensing

Course code	Course name	Category	Credits	Prereq
AI4000	Robotics	IM	3	
BM2033	Probability and Random Processes	IM	2	MA2110
BM4080	Medical image processing & analysis	IM	2	ID<sp>
BM4020	Biophotonics	IM	3	BM3090
BM4021	Medical image processing lab	IM	2	BM4080
BM5170	Ultrasound in medicine	IM	3	BM3090
BM4091	Diagnostic Imaging Lab	IM	3	ID<sp>
BM6070	Biomicrofluidics	IM	3	ID<em>; BM3040
CS3390	Machine learning, Foundations of	IM	3	
	Elective bucket total		**24**	

Biomaterials and Nanomedicine

Course code	Course name	Category	Credits	Prereq
BM3011	Medical biochemistry lab	MAT-NM	2	BM1000; BM1010
BM4001	Biomaterials Lab	MAT-NM	2	BM5090
BM4010	Medical nanotech-II	MAT-NM	2	BM3030
BM4011	Biomicrofab lab	MAT-NM	2	BM4190
BM4190	Biofabrication	MAT-NM	2	BM5090
BM5141	Biomaterials-2	MAT-NM	2	BM5090
BM4120	Tissue engg & Regenerative med	MAT-NM	3	BM5090
BO6070	Molecular Basis of Diseases	MAT-NM	3	
MS2050	Mechanical behavior of materials	MAT-NM	3	
MSxxxx	Soft Materials Proc, Struct, Char & Props	MAT-NM	3	
	Elective bucket total		**24**	

Biomechanics

Course code	Course name	Category	Credits	Prereq
BM3001	Biomechanics Lab	MEC	2	BM3040
BM4040	Mechano-biology	MEC	3	BM3040
BM4051	Computational Biomechanics Lab	MEC	2	BM3040
BM4060	Movement science	MEC	2	BM3000
BM5141	Biomaterials-2	MEC	2	BM5090
BM5160	Mechanics of bio-fluids	MEC	2	BM3040
BM6070	Biomicrofluidics	MEC	3	ID<em>; BM3040
BM6080	Advanced Biomechanics	MEC	2	ID<em>; BM3040
ME3100	Modelling and simulation	MEC	3	
MS2050	Mechanical behavior of materials	MEC	3	
	Elective bucket total		**24**	

Natural Intelligence - Artificial Intelligence

Course code	Course name	Category	Credits	Prereq
AI2010	Reinformcement learning	NI	2	BM2033; CS3390
AI4000	Robotics	NI	3	
BM2033	Probability and Random Processes	NI	2	MA2110
BM4025	Natural intelligence, Implementations of	NI	2	BM3000
BM4060	Movement science	NI	2	BM3000
BM4061	Movement sciences lab	NI	2	BM4060
BM4070	Neurotechnology & BCI theory	NI	2	ID<sp>; BM3000
BM4071	Neurotechnology & BCI lab	NI	2	BM4070
BM4081	Computational neuroscience lab	NI	2	BM6140
BM6140	Theoretical & computational neuroscience	NI	2	BM3000
CS3390	Machine learning, Foundations of	NI	3	
	Elective bucket total		**24**	

Other department courses

	Course Number	Course Name	Credits
BT	BO1010	Life Science	1
	BO6070	Molecular Basis of Diseases	3
CS	ID1063	Introduction to Programming	3
	ID2230	Data structures and applications	3
	AI2010	Reinformcement learning	2
	CS3390	Machine learning, Foundations of	3
CY	CY1018	Environmental Chemistry	2
EE	ID<ee>	Basic Electrical Engineering	3
	ID<sp>	Linear Systems and Signal Processing	3
MS	MS2050	Mechanical behavior of materials	3
	MSxxxx	Soft Materials Proc, Struct, Char & Props	3

	Course Number	Course Name	Credits
LA	LAxxxx	English Communication	2
	LAxxxx	Personality Development	1
	IDxxxx	Entrepreneurship	1
MA	MA1110	Calculus - I	1
	MA1220	Calculus - II	1
	MA1140	Elementary Linear algebra	1
	MA1150	Differential equations	1
	MA2110	Introduction to Probability	1
	MA2140	Introduction to Statistics	1
ME	ID<em>	Engineering Mechanics	3
	ID1054	Digital fabrication	2
	AI4000	Robotics	3
	ME3100	Modelling and simulation	3
PH	EP1108	Modern Physics	2
	EP1208	Electricity & magnetism	2

Course type	Credits
Core credits	43
BE credits	18
BS credits	15
SS credits	4
total mandatory	80
LA / CA electives	8
Free Electives	10
Dept. Electives	30
total electives	48
Total	128

Course	Percentage	Reference percentage
Dept.	57.03%	55-60%
Bas Engg	14.06%	11-12%
Bas Sci	11.72%	11-12%
Soft Skill	3.13%	4%
LA/CA	6.25%	7-8%
Free El	7.81%	7-8%
Total	100.00%	