School of Bioengineering

Curriculum and Syllabus

of

B. Tech in Bioengineering

(2021-2022)

Structure:	Programme Core (PC)	Programme Elective (PE)	University Core (UC)	University Elective (UE)	Total
	55	15	69	21	160

PROGRAM CORE			55 Credits
	INTRODUCTION TO BIOENGINEERING	LT	3
	PHYSIOLOGY OF CELLS AND TISSUES	LT	3
	CELL AND TISSUE CULTURE TECHNIQUES	LP	3
	HUMAN PHYSIOLOGY	LT	3
	MOLECULAR BIOLOGY AND GENETIC ENGINEERING	LTP	4
	BIOMATERIALS	LT	3
	COMPUTATIONAL BIOLOGY AND ANALYTICS	LTP	4
	IMMUNE ENGINEERING	LTP	4
	TISSUE ENGINEERING	LTP	4
	STEM CELLS AND REGENERATIVE MEDICINE	LT	3
	BIO MECHANICS	LTP	4
	MEDICAL IMAGING TECHNIQUES AND DATA ANALYSIS	LT	3
	BIOSECURITY, BIOSAFETY, BIOETHICS & IPR	LT	3
	ANALOG CIRCUITS	LTP	4
	BIO SIGNALS AND IMAGE PROCESSING	LTP	4
	BIO-SYSTEM AND CONTROL	LT	3
		Credits	55

PROGRAM ELECTIVE			15 Credits
	Biomedical instrumentation	LT	3
	Drug design and delivery	LT	3
	Cancer biology	LT	3
	Biosensors and mems	LT	3
	Design of medical devices & implants	LT	3
	Advanced biomaterials and manufacturing process	LP	3
	Epigenetics	LT	3
	Personalized medicines	LT	3

	Medical diagnosis	LT	3
	Medical robotics	LT	3
	Bio optics	LT	3
	Bio fluid mechanics	LT	3
	Introduction to signal and system	LT	3
	Biomedical instrumentation	LT	3
	Drug design and delivery	LT	3
	Cancer biology	LT	3
	Biosensors and mems	LT	3
	Design of medical devices & implants	LT	3
	Advanced biomaterials and manufacturing process	LP	3
	Design Project/ Simulation Project/ Product Development/ Special Project	PJ	3
		Credits	**15**

University Core			69 Credits
-	Project Exhibition - I	PJ	1
-	Project Exhibition - II	PJ	1
-	Engineering Project in Community Service	PJ	2
-	Summer Industrial Internship	PJ	1
-	Semester Internship	PJ	4
-	Capstone Project	PJ	5
-	Engineering Physics	LTP	4
-	Biochemistry	LTP	4
-	Calculus for Bio Engineers	LT	4
-	Applications of Differential Equations	LT	3
-	Biostatistics	LT	4
-	Transform Techniques	LT	4
-	Engineering Design and Modelling	LTP	4
-	Electric Circuits and Systems	LTP	4
-	Fundamentals of AI and ML	LTP	4
-	Effective Technical Communication	LT	2
-	Advanced Technical Communication	LT	2
-	Environmental Sustainability	LT	2
-	Introduction to Problem Solving And Programming	LP	4

-	Programming in Java		LP	3
-	Competitive Coding Practice		LP	3
-	Professional Communication Skills for Engineers		P	1
-	Dynamics of Workplace Communication		P	1
-	Lateral Thinking		LT	2
			Total Credits	**69**

University Elective	21 Credits
NATURAL SCIENCE ELECTIVES (Select any 2 Subject)	**06 Credits**

	Applied Numerical Methods	LT	3
	Computational Game Theory	LT	3
	Operations Research	LT	3
	Differential and Difference Equations	LT	3
	Random Process	LT	3
	Modelling and Simulation of Biological System	LP	3
	Biophysics	LT	3

MULTIDISCIPLINARY ELECTIVES (Select any 2 Subject)		**06 Credits**

	Human-Computer Interaction	LT	3
	Biometric and Security Systems	LT	3
	Sensor and IoT	LP	3
	Unmanned Aerial Vehicles	LT	3
	Body Area Network	LT	3
	Digital Fabrication/Mems	LT	3
	Bio Inspired Designs	LT	3
	Cyber Physical Systems	LT	3
	Foundations of Data Science	LP	3
	Introduction to Linguistics	LT	3
-	MOOC Courses	LT	3

HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT ELECTIVES (Select any 1 Subject)		**03 Credits**

-	Emotional Intelligence	LT	3
-	Behavioural Science	LT	3
-	Principles of Management And Organizational Behaviour	LT	3
-	International Business	LT	3
-	Technology Entrepreneurship	LT	3
-	Human Resource Management	LT	3

FREE ELECTIVES		**06 Credits**

-	Elective / Specialization Courses from other Schools	LT	3
-	MOOC Courses	LT	3

Minor [18 credits (6 subjects) from any one Minor Basket]				
Computational Intelligence and Knowledge Management	CSE4002	Data Visualization	LP	3
	CSE4003	Big Data Analytics	LP	3
	CSE4004	Semantic Web Technologies	LP	3
	CSE3007	Artificial Intelligence	LT	3
	CSE3008	Soft Computing	LT	3
	CSE4005	Machine Learning	LP	3
	CSE4006	Knowledge Engineering	LT	3
	Future Skill	Data Analytics /Security Analyst	LP	3
	-	Minor / Research Project	PJ	3
Block Chain	CSD3007	Block chains and Crypto currencies	LT	3
	CSD4008	Cyber Security Framework	LT	3
	CSD4009	Enterprise Cyber Security	LT	3
	CSD4003	Network and System Security	LP	3
	CSE4008	Applied Cryptography	LP	3
	CSE4009	Cyber Security	LT	3
	-	Block Chain for Businesses	LT	3
	-	Minor / Research Project	PJ	3
Computer Vision and Animation	CSE3009	Computer Graphics	LP	3
	ECE4012	Digital Image Processing	LP	3
	CSE3010	Computer Vision	LP	3
	CSE4013	Pattern recognition and Image analysis	LP	3
	CSE4014	Computer Animation	LP	3
	CSE4015	Introduction to Vision and Robotics	LP	3
	EEE3006	Robotics and Control	LT	3
	-	Minor / Research Project	PJ	3
Cyber Security	CSE4007	Wireless Networks	LP	3
	CSE4008	Applied Cryptography	LP	3
	CSE4009	Cyber Security	LT	3
	CSD1001	Principles of Digital Forensics	LT	3
	CSD4002	Ethical Hacking	LP	3
	CSE4011	Network Security	LP	3
	CSD4012	Web Security	LP	3
	-	Minor / Research Project	PJ	3
System and Software Engineering	CSE4016	Software Project Management	LT	3
	CSE4017	Software Testing	LT	3
	CSE4018	Software Quality and Reliability	LT	3
	CSE4019	Advanced Java Programming	LP	3
	CSE3011	Python Programming	LP	3
	CSE3012	Mobile Application Development	LP	3
	CSE4020	Agile Software Development	LT	3
	-	Minor / Research Project	PJ	3
Artificial Intelligence and Machine Learning	CSA6003	Algorithm for Intelligent Systems	LP	3
	CSA2002	Applied Machine Learning	LP	3
	CSA4001	Artificial Neural Networks	LT	3
	CSA3012	Cognitive Analytics	LT	3
	CSA3013	Computer Vision	LT	3
	CSA 2001	Fundamentals of AI and ML	LT	3
	CSA6002	Deep Learning	LT	3
	CSA3001	Expert Systems And Fuzzy Logic	LT	3
	-	Minor / Research Project	PJ	3