Faculty of Science, Technology and Architecture, School of Engineering
Department of Biotechnology and Chemical Engineering

Degree: B. Tech. Computer Science and Bioscience

Total Credit: 160

	First Semester	
Code	Course Name	Cr
CHY1001	Engineering Chemistry & Lab	3
MAS1001	Calculus & Matrices	3
ECE1001	Digital Systems	3
MEE1009	Manufacturing Processes	3
CSCXXXX	Problem-Solving Using Computers	3
DOA1001	Human Rights and Values	1
CSCXXXX	Problem-Solving Using Computers Lab	1
LLC1011	Communication Skills	2
MEE1036	Engineering Graphics	1
	First Semester Credits	**20**

	Second Semester	
Code	Course Name	Cr
PHY1001	Engineering Physics & Lab	4
MAS1002	Computational Mathematics	3
CHY1002	Environmental Studies	2
CSCXXXX	Fundamentals of Data Structures	3
CSCXXXX	Data Visualization	2
MEE1038	Creativity & Innovation IDEA Lab	2
BIT1001	Biology for Engineers	2
CSCXXXX	Fundamentals of Data Structure Lab	1
DOA1002	Wellness and Community Services	1
	Second Semester Credits	**20**

	Third Semester	
Code	Course Name	Cr
CSB2103	Fundamentals of Molecular Biology and Genetics	4
MBB21xx	Principles of Management/ Engineering Economics	3
CSB2105	Data Structure and Algorithms	4
CSB2106	Relational Database Management System	4
CSB2107	Object oriented Programming	4
CSB2130	Relational Database Management System Lab	1
CSB2132	Data Structure and Algorithms Lab	1
CSB2133	Basic Analytical Lab	1
	Third Semester Credits	**22**

	Fourth Semester	
Code	Course Name	Cr
MAS20XX	Probability and Statistics	3
CSB2202	Design and Analysis of Algorithms	4
MBB21xx	Principles of Management/ Engineering Economics	3
CSB2205	Artificial Intelligence	4
LLCXXXX	Technical Report Writing	2
CSB2204	Bioinformatics	4
CSB2231	Design and Analysis of Algorithms Lab	1
CSB2232	Bioinformatics Lab	1
CSB2271	Project Based Learning – 1	3
	Fourth Semester Credits	**25**

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Fifth Semester		
Code	Course Name	Cr
CSB3102	Computational and Structural Biology	4
CSB3103	Data Science and Machine Learning	4
CSB3104	Information System Security	4
CSB3105	Recombinant DNA Technology	4
CSBXXXX	Program Elective 1	3
CSB3130	Computational and Structural Biology Lab	1
CSB3132	Data Science and Machine Learning Lab	1
CSB3171	Project Based Learning - 2	3
	Fifth Semester Credits	24

Sixth Semester		
Code	Course Name	Cr
	Sixth Semester	
Code	Course Name	Cr
CSB3203	Immunodiagnostics and Vaccine Technology	4
CSB3204	Genomics and Proteomics	4
CSBXXXX	***Industry Elective (PBL -3)	3
CSBXXXX	Program Elective 2	3
CSBXXXX	Program Elective 3	3
CSBXXXX	Program Elective 4	3
XXXXXXX	Open Elective	3
	Sixth Semester Credits	23

Seventh Semester		
Code	Course Name	Cr
XXXXXXX	Open Elective	3
XXXXXXX	Open Elective	3
CSBXXXX	Program Elective 5	3
CSBXXXX	Program Elective 6	3
CSB4170	Internship (Industry/ Research/ Industry Certification)	2
	Seventh Semester Credits	14

Eighth Semester		
Code	Course Name	Cr
CSB4270	Major Project	12
	Eighth Semester Credits	12

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Program Electives

Artificial Intelligence and Machine Learning	**Cyber Security**
1. Deep Learning (PE-2) 2. Advance Machine Learning Techniques (PE-3) 3. Natural Language Processing (PE-4) 4. Computer Vision and Pattern Recognition (PE-5) 5. Project Based Learning- 4 (PE-6)	1. Essentials of Cyber Security (PE-2) 2. Ethical Hacking (PE-3) 3. Blockchain Technology (PE-4) 4. Digital Forensics & Privacy Preservation (PE-5) 5. Project Based Learning-4 (PE-6)
Data Science	**Internet of Things**
1. Data Visualization (PE-2) 2. Big Data Analytics (PE-3) 3. Deep Learning (PE-4) 4. Information Retrieval (PE-5) 5. Project Based Learning -4 (PE-6)	1. Introduction to IoT (PE-2) 2. Privacy and Security in IoT (PE-3) 3. Industrial IoT (PE-4) 4. Cyber Physical System 5. Project Based Learning -4 (PE-6)
Data Science in Biology	**Medical and Health Bioinformatics**
1. Python Programming for Biotechnologists (PE 2) 2. R programming for Bioscience (PE 3) 3. Data mining and Machine Learning for Bioinformatics (PE 4) 4. Neural Networks (PE 5) 5. Bioperl (PE 6)	1. Data Management in Healthcare Analytics (PE 2) 2. Forensic Science and Technology (PE 3) 3. Cheminformatics and QSAR (PE 4) 4. Artificial Intelligence and Cloud Computing in Healthcare (PE 5) 5. Legal and Ethical Aspects of Health Informatics (PE 6)

Industry Elective

1. Project Based Learning-3	1. Industry Elective 1- Analytics Insights 2. Industry Elective 2 3. Industry Elective 3

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Program Elective 1/ Program Elective 6

1. Computer Vision 2. Computer Graphics and Multimedia Systems 3. Social Network Analysis 4. Augmented and Virtual Reality 5. High Performance Computing 6. Image Processing and Application 7. Quantum Computing 8. Nature Inspired Computing	9. Compiler Design 10. Software Testing 11. Protein Engineering 12. Metabolic Engineering 13. Comparative and Functional Genomics 14. Metagenomics 15. Synthetic biology

Program Elective 6 * Students pursuing a specialization will undertake a project relevant to their chosen field Development Oriented Project
Design Oriented Project
Lab Oriented Project
Study Oriented Project