

## Curriculum for Undergraduate Degree (B.Tech.) in Computer Science and Engineering (AI and ML) (w.e.f. AY: 2022-23)

### Part II: Course Structure & Semester wise Credit Distribution

First Semester (First Year)							
Mandatory Induction Program- 3 Weeks Duration							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	BS	BS-PH101	Physics	3	1	0	4
2	BS	BS-M101	Mathematics-I	3	1	0	4
3	ES	ES-EE101	Basic Electrical & Electronics Engineering	3	1	0	4
4	HM	HM-HU101	English	2	0	0	2
	Total Theory			11	3	0	14
Practical/ Sessional/ Mandatory Course							
1	BS	BS-PH191	Physics Laboratory	0	0	3	1.5
2	ES	ES-EE191	Basic Electrical & Electronics Engineering Lab	0	0	4	2
3	ES	ES-ME191	Engineering Graphics & Design Lab	1	0	4	3
	Total Practical/ Sessional/ Mandatory Course			1	0	11	6.5
Total of First Semester				12	3	11	20.5

Second Semester (First Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	BS	BS-CH201	Chemistry	3	1	0	4
2	BS	BS-M201	Mathematics-II	3	1	0	4
3	ES	ES-CS201	Programming for Problem Solving	3	0	0	3
Total Theory				9	2	0	11
Practical/ Sessional/ Mandatory Course							
1	BS	BS-CH291	Chemistry Laboratory	0	0	3	1.5
2	ES	ES-CS291	Programming for Problem Solving Lab	0	0	4	2
3	ES	ES-ME292	Workshop/Manufacturing Practices Lab	1	0	4	3
4	HM	HM-HU291	Language Laboratory	0	0	2	1
Total Practical/ Sessional/ Mandatory Course				1	0	13	7.5
Total of Second Semester				10	2	13	18.5

Third Semester (Second Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	ES	ES-EC302	Digital Electronics	3	0	0	3
2	ES	ES-EC304	Signals and Systems	3	0	0	3
3	BS	BS-M305	Mathematics III	3	0	0	3
4	HM	HM-HU301	Introduction to Industrial Management	2	0	0	2
5	PC	PC-CS301	Data Structures and Algorithms	3	0	0	3
6	BS	BS-BIO301	Biology	2	0	0	2
Total Theory				16	0	0	16
Practical/ Sessional/ Mandatory Course							
1	ES	ES-EC392	Digital Electronics Lab	0	0	3	1.5
2	PC	PC-CS391	Data Structures and Algorithms Lab	0	0	3	1.5
3	PC	PC-CS392	IT Workshop (Using Python) Lab	0	0	3	1.5
5	MC	MC371	Environmental Sciences	2	0	0	0
Total Practical/ Sessional / Mandatory Course				2	0	9	4.5
Total of Third Semester				18	0	9	20.5

Fourth Semester (Second Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	PC	PC-CS(D)401	Computer Organization and Architecture	3	0	0	3
2	PC	PC-CS402	Operating System	3	0	0	3
3	PC	PC-CS403	Design and Analysis of Algorithm	3	0	0	3
4	PC	PC-CS404	Discrete Mathematics	3	0	0	3
5	PC	PC-CS405	Formal Language and Automata Theory	3	0	0	3
6	HM	HM-HU 401	Economics for Engineers	3	0	0	3
Total Theory				18	0	0	18
Practical/ Sessional / Mandatory Course							
1	PC	PC-CS(AM) 491	Object Oriented Programming Lab	0	1	2	2
2	PC	PC-CS(AM)492	Operating System Lab	0	0	2	1
3	PC	PC-CS493	Design and Analysis of Algorithm Lab	0	0	3	1.5
4	HM	HM-HU491	Soft Skill Development Lab	0	0	2	1
5	MC	MC472	Constitution of India	2	0	0	0
Total Practical/ Sessional/ Mandatory Course				2	1	9	5.5
Total of Fourth Semester				20	1	9	23.5

Fifth Semester (Third Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	BS	BS-M504	Numerical Methods	2	0	0	2
2	PC	PC-CS(D)501	Machine Learning	3	0	0	3
3	PC	PC-CS(AM)502	Artificial Intelligence	3	0	0	3
4	PC	PC-CS(AM)503	Computer Networks	3	0	0	3
5	PC	PC-CS(AM)504	High Performance Computing	3	0	0	3
6	PE	PE-CS501	Professional Elective-I	3	0	0	3
Total Theory				17	0	0	17
Practical/ Sessional/ Mandatory Courses							
1	PC	PC-CS(D)591	Machine Learning Lab	0	0	3	1.5
2	PC	PC-CS(AM)592	Artificial Intelligence Lab	0	0	3	1.5
3	PC	PC-CS(AM)593	Computer Networks Lab	0	0	3	1.5
4	MC	MC571	Aptitude Skill Development-I	2	0	0	0
Total Practical/ Sessional/ Mandatory Courses				2	0	9	4.5
Total of Fifth Semester				19	0	9	21.5

<b>PE-CS(D)501</b>	<b>Professional Elective-I</b>
PE-CS(D)501A	Software Engineering
PE-CS501B	Advanced Algorithm
PE-CS(AM)501C	Compiler Design

Sixth Semester (Third Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	PC	PC-CS(AM)601	Neural Network and Deep Learning	3	0	0	3
2	PC	PC-CS602	Database Management System	3	0	0	3
3	PC	PC-CS(AM)603	Cloud Computing	3	0	0	3
5	PE	PE-CS601	Professional Elective-II	3	0	0	3
6	PE	PE-CS602	Professional Elective-III	3	0	0	3
Total Theory				15	0	0	15
Practical/ Sessional/ Mandatory Courses							
1	PC	PC-CS692	Database Management System Lab	0	0	3	1.5
2	PC	PC-CS694	Software Development and IT Operations Lab	0	0	2	1
3	PW	PW-CS681	Project-I	0	0	6	3
4	MC	MC671	Aptitude Skill Development-II	2	0	0	0
Total Practical/ Sessional/ Mandatory Courses				2	0	11	5.5
Total of Sixth Semester				17	0	11	20.5

List of Elective Courses	
<b>PE-CS601</b>	<b>Professional Elective-II</b>
PE-CS601A	Data Mining
PE-CS601B	Pattern Recognition
PE-CS601C	Image Processing
<b>PE-CS602</b>	<b>Professional Elective-III</b>
PE-CS602A	Distributed Computing
PE-CS602B	Soft Computing
PE-CS602C	Data Analysis and Visualization

Seventh Semester (Fourth Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	PE	PE-CS701	Professional Elective-IV	3	0	0	3
2	PE	PE-CS702	Professional Elective-V	3	0	0	3
3	OE	OE 701	Open Elective-I	3	0	0	3
4	OE	OE 701	Open Elective-II	3	0	0	3
Total Theory				12	0	0	12
Practical/ Sessional							
1	PW	PW-CS781	Project-II	0	0	8	4
2	PW	PW-CS782	Summer Internship	0	0	4	2
Total Practical/ Sessional				0	0	12	6
Total of Seventh Semester				12	0	12	18
List of Elective Courses							
PE-CS701		Professional Elective-IV					
PE-CS 701A		Quantum Computing					
PE-CS(D)701A		Data Security and Authentication					
PE-CS(AM)701A		Computer Graphics					
PE-CS702		Professional Elective-V					
PE-CS(AM)702A		Fundamentals of Natural Language Processing					
PE-CS702B		Block Chain Technology					
PE-CS(D)702C		Uncertainty Modelling and Multi-value Logic					
OE-701		Open Elective-I					
OE-EC701A		Adhoc and Sensor Network					
OE-EC701B		Microprocessor and Microcontroller					
OE-IT701D		Multimedia Systems					
OE-M701A		Operations Research and Optimizing Technique					
OE-701		Open Elective-II					
OE-HU701B		Human Resource Development and Organizational Behavior					
OE-HU701D		Time Series Analysis and Forecasting					
OE-IT701A		Introduction to Bioinformatics					
OE-IT701B		Cyber Law and Security Policy					

Eighth Semester (Fourth Year)							
Sl No.	Category	Course Code	Course Name	Contact Hours			Credits
				L	T	P	
Theory							
1	HM	HM-HU802	Professional Ethics and Project Management	2	0	0	2
2	PE	PE-CS801	Professional Elective-VI	3	0	0	3
3	OE	OE 801	Open Elective-III	3	0	0	3
4	OE	OE 801	Open Elective-IV	3	0	0	3
Total Theory				11	0	0	11
Practical/ Sessional							
1	PW	PW-CS881	Project-II	0	0	12	6
Total Practical/ Sessional				0	0	12	6
Total of Eighth Semester				11	0	12	17

List of Elective Courses	
<b>PE-CS801</b>	<b>Professional Elective-VI</b>
PE-CS801A	Big Data Analytics
PE-CS801B	Cryptography and Network Security
PE-CS801C	Web and Internet Technology
PE-CS801D	Generative AI
<b>OE-801</b>	<b>Open Elective-III</b>
OE-HU801B	Business Intelligence
OE-HU801G	Introduction to Philosophical Thoughts
OE-IT801B	E-Commerce
OE-IT801C	Internet of Things
<b>OE-801</b>	<b>Open Elective-IV</b>
OE-EC801A	Information and Coding Theory
OE-HU801A	Business Analytics and Entrepreneurship
OE-HU801E	Financial Management
OE-IT801D	Social Media and Web Analytics