

NAAC Accredited "A" Grade Autonomous Institute under UGC Act 1956
Approved by AICTE & affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal

243 G.T. Road (N), Liluah, Howrah-711204, West Bengal, India

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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)									
Manda	Mandatory Induction Program- 3 Weeks Duration									
SI	Category	Course Code	Course Name		tact H		Credits			
No.	Category	Course Coue	Course realic	L	T	P	Cicuits			
Theory	y									
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						14			
Practio	al/ Sessional/	Mandatory Cour	se							
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					11	6.5			
Total	Total of First Semester					11	20.5			

	Second Semester (First Year)									
SI C. C.			C	Con	C 1'4.					
No.	Category	Course Code	Course Name	L	T	P	Credits			
Theory	y									
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 T	Total Theory					0	11			
Practio	cal/ Sessional/	Mandatory Cour	se							
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	Total Practical/ Sessional/ Mandatory Course			1	0	13	7.5			
Total	Total of Second Semester			10	2	13	18.5			



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	Third Semester (Second Year)									
Sl	Sl Catego Course Code Course Name				tact H	ours	Credit			
No.	ry	Course Code	Course Name	L	T	P	S			
Theor	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	НМ	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				0	0	16			
Practi	ical/ Sessio	nal/ 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				0	9	20.5			

	Fourth Semester (Second Year)									
Sl	Catego	Course Code	Course Code Course Name Contact			Hours	Credit			
No.	ry	Course Code	Course Name	L	T	P	S			
Theor	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					0	18			
Practi	ical/ Sessio	onal / Mandatory C	ourse							
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				1	9	23.5			



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	Fifth Semester (Third Year)									
Sl	Catego	Course Code	Course Name	Con	tact H	ours	Credit			
No.	ry	Course Code	Course Name	L	T	P	S			
Theor	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					0	17			
Practi	ical/ Sessio	onal/ Mandatory Co	urses							
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				0	9	4.5			
		Total of Fif	th Semester	19	0	9	21.5			

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



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	Sixth Semester (Third Year)									
SI	Catego	Commo Codo	Connec Norma			ours	Credit			
No.	ry	Course Code	Course Name	L	T	P	S			
Theor	·y									
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				0	0	15			
Practi	ical/ Sessio	onal/ Mandatory Co	urses							
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						
PE-CS601	Professional Elective-II						
PE-CS601A	Data Mining						
PE-CS601B	Pattern Recognition						
PE-CS601C	Image Processing						
PE-CS602	Professional Elective-III						
PE-CS602A	Distributed Computing						
PE-CS602B	Soft Computing						
PE-CS602C	Data Analysis and Visualization						



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Practical/ Sessional 1 PW PW-CS781 Project-II 0 0 8 2 PW PW-CS782 Summer Internship 0 0 4 Total Practical/ Sessional 0 0 12	Seventh Semester (Fourth Year)									
No. ry Course Code Course Name L T P	Sl	Sl Catego a a				Contact Hours				
PE	No.	_	Cours	se Code	Course Name	L	T	P	s	
PE	Theor	. y					•	•		
3	1	PE	PE-CS	701	Professional Elective-IV	3	0	0	3	
A	2	PE				3	0	0	3	
Total Theory	3	OE	OE 70	1	Open Elective-I	3	0	0	3	
Practical/ Sessional 1 PW PW-CS781 Project-II 0 0 8 2 PW PW-CS782 Summer Internship 0 0 4 Total Practical/ Sessional 0 0 12 Total of Seventh Semester 12 0 12 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-CS(AM)702A Fundamentals of Natural Language Processing 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-M701A Operations Research and Optimizing Technique	4	OE	OE 70		*		0	0	3	
1 PW PW-CS781 Project-II 0 0 8 2 PW PW-CS782 Summer Internship 0 0 4 Total Practical/ Sessional 0 0 12 Total of Seventh Semester 12 0 12 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-CS(AM)701A Fundamentals of Natural Language Processing PE-CS(D)702A Fundamentals of Natural Language Processing PE-CS(D)702C Uncertainty Modelling and Multi-value Logic OE-RC701A Adhoc and Sensor Network OE-EC701B Microprocessor and Microcontroller OE-IT701D Multimedia Systems OE-M701A Operations Research and Optimizing Technique				Tota	l Theory	12	0	0	12	
2 PW PW-CS782 Summer Internship 0 0 4 Total Practical/ Sessional 0 0 12 Total of Seventh Semester 12 0 12 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-CS702B Block Chain Technology 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							1	1	T	
Total of Seventh Semester Total of Seventh Semester 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								-	4	
Total of Seventh Semester 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	2	PW			*	_			2	
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									6	
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	T • 4	CEL 4:			venth Semester	12	0	12	18	
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			Course		· 151 / W/					
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										
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				· · ·						
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	——			·						
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			701A							
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	P	PE-CS702								
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	PI	E-CS(AM)	702A	Fundamentals of Natural Language Processing						
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	PI	E-CS702B		Block Chain Technology						
OE-EC701A Adhoc and Sensor Network OE-EC701B Microprocessor and Microcontroller OE-IT701D Multimedia Systems OE-M701A Operations Research and Optimizing Technique	PF	E-CS(D)70	2C	Uncertainty Modelling and Multi-value Logic						
OE-EC701B Microprocessor and Microcontroller OE-IT701D Multimedia Systems OE-M701A Operations Research and Optimizing Technique	0	E-701								
OE-IT701D Multimedia Systems OE-M701A Operations Research and Optimizing Technique	Ol	E-EC701A		Adhoc	and Sensor Network					
OE-M701A Operations Research and Optimizing Technique	Ol	E-EC701B		Microprocessor and Microcontroller						
	OE-IT701D		Multimedia Systems							
OE-701 Open Elective-II	OE-M701A		Operations Research and Optimizing Technique							
	OE-701 O		Open Elective-II							
OE-HU701B Human Resource Development and Organizational Behavior	OE-HU701B		Human	Resource Development and Organizat	ional Bel	navior				
OE-HU701D Time Series Analysis and Forecasting	OE-HU701D		Time Series Analysis and Forecasting							
OE-IT701A Introduction to Bioinformatics	О	E-IT701A		Introduction to Bioinformatics						
OE-IT701B Cyber Law and Security Policy	О	E-IT701B		Cyber I	Law and Security Policy					



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	Eighth Semester (Fourth Year)									
Sl	Sl Catego C C. l. C N				tact H	ours	Credit			
No.	ry	Course Code	Course Name	L	T	P	S			
Theor	y									
1	НМ	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					0	11			
Practi	Practical/ Sessional									
1	PW	PW-CS881	PW-CS881 Project-II		0	12	6			
	Total Practical/ Sessional			0	0	12	6			
	Total of Eighth Semester					12	17			

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