

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in CSE(Data Science)
(Applicable from the academic session 2020-2021)

Curriculum Structure
First Year First Semester

Mandatory Induction Program- 3 week's duration

Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Basic Science Course	BS-PH101/	Physics-I (Gr-A)/	3	1	0	4
		BS-CH101	Chemistry-I(Gr-B)				
2	Basic Science Course	BS-M101/	Mathematics –IA*/	3	1	0	4
		BS-M102	Mathematics –IB *				
3	Engineering Science Courses	ES-EE101	Basic Electrical Engineering	3	1	0	4
		Total Theory		9	3	0	12
Practical							
1	Basic Science Course	BS-PH191/ BS-CH191	Physics-I Laboratory(Gr-A) / Chemistry-I Laboratory (Gr-B)	0	0	3	1.5
2	Engineering Science Courses	ES-EE191	Basic Electrical Engineering Laboratory	0	0	2	1
3	Engineering Science Courses	ES-ME191/ ES-ME192	Engineering Graphics & Design(Gr-B)/ Workshop/Manufacturing Practices(Gr-A)	1	0	4	3
		Total Practical		1	3	9	5.5
		Total credit for First Semester		10	3	9	17.5

* **Mathematics –IA (BS-M101) - CSE, IT, AI&ML and DS**
Mathematics –IB (BS-M102) - All stream except CSE, IT, AI&ML and DS

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Second Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Basic Science Course	BS-PH201/ BS-CH201	Physics-I (Gr-B)/ Chemistry-I (Gr-A)	3	1	0	4
2	Basic Science Course	BS-M201/ BS-M202	Mathematics –IIA#/ Mathematics –IIB #	3	1	0	4
3	Engineering Science Courses	ES-CS201	Programming for Problem Solving	3	0	0	3
4	Humanities and Social Sciences including Management Courses	HM-HU201	English	2	0	0	2
		Total Theory		11	2	0	13
Practical							
1	Basic Science courses	BS-PH291/ BS-CH291	Physics-I Laboratory (Gr-B)/ Chemistry-I Laboratory (Gr-A)	0	0	3	1.5
2	Engineering Science Courses	ES-CS291	Programming for Problem Solving	0	0	4	2
3	Engineering Science Courses	ES-ME291/ ES-ME292	Engineering Graphics & Design(Gr-A)/ Workshop/Manufacturing Practices(Gr-B)	1	0	4	3
4	Humanities and Social Sciences including Management courses	HM-HU291	Language Laboratory	0	0	2	1
		Total Practical		1	0	13	7.5
		Total of Second Semester		12	2	13	20.5

Mathematics –II (BS-M201) - CSE , IT, AI&ML and DS
Mathematics –II (BS-M202) - All stream except CSE, IT, AI&ML and DS

	Group-A	Group-B
1st Year 1st Semester	Physics-I (BS-PH101); Workshop/Manufacturing Practices (ES-ME192)	Chemistry-I (BS-CH101); Engineering Graphics & Design (ES-ME191)
1st Year 2nd Semester	Chemistry-I (BS-CH201); Engineering Graphics & Design (ES-ME291)	Physics-I (BS-PH201); Workshop/Manufacturing Practices (ES-ME292)

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Third Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Engineering ScienceCourse	ESC301	Analog and Digital Electronics	3	0	0	3
2	Professional Core Courses	PCC-CS301	Data Structure & Algorithms	3	0	0	3
3	Professional Core Courses	PCC-CS302	Computer Organization	3	0	0	3
4	Professional Core Courses	PCC-DS301	Introduction to Data Science	3	0	0	3
5	Basic Sciencecourse	BSC 301	Mathematics-III (Differential Calculus)	2	0	0	2
6	Humanities &Social Sciences including Management Courses	HSMC 301	Economics for Engineers (Humanities-II)	3	0	0	3
		Total Theory		14	0	0	17
Practical							
1	Professional Core Courses	PCC-CS391	Data Structure & Algorithms Lab	0	0	4	2
2	EngineeringScience Course	ESC391	Analog and Digital Electronics Lab	0	0	4	2
3	Professional Core Courses	PCC-CS392	Computer Organization	0	0	4	2
4	Professional Core Courses	PCC- DS391	Data Science Lab using Python	0	0	4	2
		Total Practical		0	0	16	8
		Total Credit for Third Semester		25			

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Fourth Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Professional Core Courses	PCC- CS401	Discrete Mathematics	3	1	0	4
2	Professional Core Courses	PCC-DS 401	Database ManagementSystem	3	0	0	3
3	Professional Core Courses	PCC-CS403	Formal Language & Automata Theory	3	0	0	3
4	Professional Core Courses	PCC-CS 404	Design & Analysis of Algorithms	3	0	0	3
5	Professional Core Courses	PCC-DS 402	Data Mining	3	0	0	3
6	Basic Science Courses	BSC 401	Biology	2	1	0	3
7	Mandatory Courses	MC401	Environmental Sciences	1	0	0	0
		Total Theory		18	1	0	19
Practical							
1	Professional Core Courses	PCC-DS 491	Database Management System Lab	0	0	4	2
2	Professional Core Courses	PCC- CS 494	Design & Analysis of Algorithms Lab	0	0	4	2
3	Professional Core Courses	PCC- DS492	Data Mining Lab	0	0	4	2
		Total Practical		0	0	12	6
		Total credit for Fourth Semester	25				

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Fifth Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Engineering Science Course	ESC501	Software Engineering	3	0	0	3
2	Professional Core Courses	PCC- DS501	Statistics for Data Science	3	0	0	3
3	Professional Core Courses	PCC- CS502	Operating Systems	3	0	0	3
4	Professional Core Courses	PCC-CS503	Object Oriented Programming	3	0	0	3
5	Humanities & Social Sciences Including Management Courses	HSMC-501	Introduction to Industrial Management (Humanities III)	3	0	0	3
6	Professional Elective Courses	PEC-DS 501A/B/C/D/E	(Elective-I)Theory of Computation/Mobile Computing and Applications / Advanced Computer Architecture/ Computer Graphics/ Compiler Design	3	0	0	3
7	Mandatory Courses	MC- CS501	Constitution of India/ Essence of Indian Knowledge Tradition	0	0	0	0
		Total Theory		18	0	0	18
Practical							
1	Professional Core Courses	ESC-591	Software Engineering Lab		0	4	2
2	Professional Core Courses	PCC-CS592	Operating Systems Lab		0	4	2
3	Professional Core Courses	PCC-CS593	Object Oriented Programming Lab		0	4	2
		Total Practical		0	0	12	6
		Total credit for Fifth Semester			24		

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Sixth Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Professional Core Courses	PCC-DS601	Artificial Intelligence	3	0	0	3
2	Professional Core Courses	PCC-DS602	Data Communication and Computer Networks	3	0	0	3
3	Professional Core Courses	PCC-DS603	Big Data Technology	3	0	0	3
4	Professional Elective Courses	PEC-DS601A/B/C/D/E	(Elective-II) Advanced Algorithms/ Distributed Systems/ Information Security / Image Processing/ Machine Learning	3	0	0	3
5	Professional Elective Courses	PEC-DS602A/B / C/D	(Elective-III) Parallel and Distributed Algorithms/ Data Warehousing /Human Computer Interaction/ Data Analysis and Modeling Technique	3	0	0	3
6	Open Elective Courses	OEC-DS601A/B/C	(Open Elective-) NumericalMethods/ Human Resource Development and Organizational Behavior/ Social Computing	3	0	0	3
7	Project	PROJ-DS601	Research Methodology	3	0	0	3
		Total Theory		21	0	0	19
Practical							
1	Professional Core Courses	PCC-CS(DS)691	Artificial Intelligence Lab	0	0	4	2
2	Professional Core Courses	PCC-CS692	Data Communication and Computer Networks Lab	0	0	4	2
3	Professional Core Courses	PCC-DS693	Big Data Technology and OLAP Lab	0	0	4	2
		Total Practical		0	0	12	6
		Total of Sixth Semester		25			

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Seven Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
2	Professional Core Courses	PEC-DS701A/B/C/D/E/F	(Elective-IV) Quantum Computing/ Cloud Computing/ Digital Signal Processing/Multi-agent Intelligent Systems/ Time Series Analysis and Forecasting / Data Visualization	3	0	0	3
3	Professional Elective Courses	PEC- DS 702A/B/ C/D/E/F	(Elective-V) Neural Networks and Deep Learning/ Soft Computing/ Ad-Hoc and Sensor Networks/Information Theory and Coding/Surveillance and Cyber Security / Pattern Recognition	3	0	0	3
4	Open Elective courses	OEC- DS 701A/B/ C	(Open Elective-II) Operations Research/Multimedia Technology/ Soft Skill & Interpersonal Communication	3	0	0	3
5	Humanities &Social Sciences including Management Courses	HSMC701	Project Management and Entrepreneurship	2	1	0	3
6	Project	PROJ-CS781	Project-II	0	0	12	6
		Total credit for Seven Semester			18		

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Eight Semester							
Sl No.	Category	Subject Code	Subject Name	Total Number of Contact hours			Credits
				L	T	P	
Theory							
1	Professional Elective courses	PEC- DS 801A/ B/C/D/E	(Elective-VI) Signals and Networks/Quant um Cryptography and Network Security / Natural Language Processing Computer Vision/ Web and Internet Technology/Internet of Things	3	0	0	3
2	Open Elective courses	OEC- DS801A/B/C/D	Open Elective-III Big Data Analysis/Cyber Law and Ethics/ Mobile Computing/Robo tics	3	0	0	3
3	Open Elective courses	OEC- DS 802A/B/C	Open Elective-III Business Analytics /Data Science Ethics / Number Theory	3	0	0	3
4	Project	PROJ- DS881	Project-III	0	0	12	6
		Total of Eight Semester			15		