

# **B.Tech. CSE**

## **Data Science**

### **(In Association with IBM)**

**Programme Code: CSDB**

**Duration: 4 Years**

## **Course Structure under Choice Based Credit System (CBCS)**



**EFFECTIVE FROM SESSION: 2021-2022**

**Department of Computer Science Engineering**

**Faculty of Engineering & Technology**

**CHHATRAPATI SHIVAJI MAHARAJ  
UNIVERSITY PANVEL, NAVI MUMBAI**

**Eligibility:**

All such Candidates who have been awarded or are qualified for 10+2 Std. Examination or equivalent certificate with Physics and Mathematics as compulsory subjects along with one of the Chemistry/ Biotechnology/ Biology/Technical Vocational subject with at least 45% marks in aggregate OR Passed Diploma examination in relevant branch of Engineering with at least 45% marks in aggregate are eligible to apply for admission to the **B. Tech. Computer Science and Engineering** programme.

**Duration:**

The **B. Tech Computer Science and engineering** programme will normally be four academic years duration spanning over **eight semesters**.

**Semester-wise Teaching and Evaluation scheme:**

<b>Semester I</b>										
<b>Course Type</b>	<b>Course Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>IA</b>	<b>UE</b>	<b>Total Marks</b>	<b>Credit</b>	
<b>BS</b>	MTHG1000	Engineering Mathematics- I	3	1	-	30	70	100	4	
<b>BS</b>	PHYG1000	Engineering Physics	3	1	-	30	70	100	4	
<b>ES</b>	CSEG1000	Programming for Problem Solving	3	-	-	30	70	100	3	
<b>HSM</b>	ENGG1000	English Communication Skill	2	-	-	30	70	100	2	
<b>ISC</b>	IBMB1010	Python Programming	2	-	2	-	-	150	3	
<b>HSM</b>	ENGG1001	English Communication Skill lab	-	-	2	15	35	50	1	
<b>BS</b>	PHYG1001	Engineering Physics Lab	-	-	4	15	35	50	2	
<b>ES</b>	CSEG1001	Programming for Problem Solving Lab	-	-	4	15	35	50	2	
<b>ES</b>	MECG1000	Engineering Mechanics	3	1	-	30	70	100	4	
<b>MC</b>		Induction Program*	3 weeks duration							0
		<b>Total</b>	<b>16</b>	<b>3</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>800</b>	<b>25</b>	

Semester II									
Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
BS	MTHG2000	Engineering Mathematics II	3	1	-	30	70	100	4
BS	CHYG2000	Engineering Chemistry	4	-	-	30	70	100	4
ES	MECG2001	Engineering Graphics	1	-	4	30	70	100	3
ES	ELEG2000	Basic Electrical Engineering	3	1	-	30	70	100	4
ISC	IBMB2010	Business Intelligence (Mastery Badge)	2	-	2	-	-	150	3
BS	CHYG2001	Engineering Chemistry Lab	-	-	4	15	35	50	2
ES	MECG2001	Workshop	1	-	4	30	70	100	3
ES	ELEG2000	Basic Electrical Engineering Lab	-	-	2	15	35	50	1
MC	EVSG2000	Environmental Studies	2	1		15	35	50	0
		<b>Total</b>	<b>16</b>	<b>3</b>	<b>16</b>	<b>-</b>	<b>-</b>	<b>800</b>	<b>25</b>

Semester III									
Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSDB3010	Introduction to Data Science	3	1	-	30	70	100	4
DC	CSB3010	Data Structure With C	4	-	-	30	70	100	4
DC	CSEB3020	Software Engineering and Computer Networks	4	-	-	30	70	100	4
ES	EETB3110	Digital Logic Design	3	-	-	30	70	100	3
ISC	IBMB3010	Data Visualization with Python & R	2	-	2	-	-	150	3
BS	MTHG3000	Engineering Mathematics- III	3	1	-	30	70	100	4
DC	CSEB3011	Data Structure With C Lab	-	-	4	15	35	50	2
DC	CSEB3021	Software Engineering and Computer Networks Lab	-	-	4	15	35	50	2
ES	ELEG2000	Basic Electrical Engineering Lab	-	-	2	15	35	50	1
DC	EETB3111	Digital Logic Design Lab	-	-	4	15	35	50	2
HM	SEMB3005	Seminar-I	-	-	2	15	35	50	1
		<b>Total</b>	<b>20</b>	<b>1</b>	<b>18</b>	<b>-</b>	<b>-</b>	<b>900</b>	<b>30</b>

## Semester IV

Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSEB4010	Computer Organization And Architecture	4	-	-	30	70	100	4
DC	CSEB4020	Operating Systems	4	-	-	30	70	100	4
DC	CSEB4030	Database Management Systems	4	-	-	30	70	100	4
DC	ITEB4040	Web Designing with PHP	3	-	-	30	70	100	3
ISC	IBMB4020	Big Data Architecture	2	-	2	-	-	150	3
ES	MTHG4000	Discrete Mathematics and Statistical Tools	3	1	-	30	70	100	4
DC	CSEB4011	Computer Organization And Architecture Lab	-	-	4	15	35	50	2
DC	CSEB4021	Operating Systems Lab	-	-	4	15	35	50	2
DC	CSEB4031	Database Management Systems Lab	-	-	2	15	35	50	1
DC	ITEB4041	Web Designing with PHP Lab	-	-	4	15	35	50	2
HM	SEMB4005	Seminar-II	-	-	2	15	35	50	1
		<b>Total</b>	<b>20</b>	<b>1</b>	<b>18</b>	<b>-</b>	<b>-</b>	<b>900</b>	<b>30</b>

## Semester V

Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSEB5010	Formal Language and Automata Theory	4	-	-	30	70	100	4
DC	CSEB5020	Design & Analysis of Algorithms	4	-	-	30	70	100	4
DC	CSEB5030	Computer Networks	2	1	-	30	70	100	3
DC	CSEB5040	Object Oriented Programming	2	1	-	30	70	100	3
ES	ECEB5110	Signals & Systems	3	-	-	30	70	100	3
ISC	IBMB5020	Spark and Scala Fundamentals	3	-	-	-	-	100	2
DE	**	Elective-I	4	-	-	30	70	100	4
HM	LLLB5000	Constitution of India	1	-	-	15	35	50	1
DC	CSEB5011	Formal Language and Automata Theory Lab	-	-	4	15	35	50	2
DC	CSEB5021	Design & Analysis of Algorithms Lab	-	-	4	15	35	50	2
DC	CSEB5040	Object Oriented Programming Lab	-	-	2	15	35	50	1
EC	**	Elective-I Lab	-	-	4	15	35	50	2
DC	CSIB5051	Aptitude and Simulation Lab	-	-	1	15	35	50	1
		<b>Total</b>	<b>24</b>	<b>1</b>	<b>18</b>	<b>-</b>	<b>-</b>	<b>1000</b>	<b>32</b>

## Semester VI

Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSEB6010	Compiler Design	4	-	-	30	70	100	4
DC	CSDB6020	HADOOP and Big Data Analytics	4	-	-	30	70	100	4
DC	CSDB6030	Introduction to Business Analytics	3	-	-	30	70	100	3
DC	CSEB6040	Data Mining and Warehousing	3	-	-	30	70	100	3
ISC	IBMB6010	Predictive Modelling (Mastery Badge)	2	-	2	-	-	150	3
ISC	IBMM6020	Big Data Security	3	-	-	-	-	100	2
DE	**	Elective-II	4	-	-	30	70	100	4
OE	**	Open Elective-I	3	-	-	30	70	100	3
DC	CSEB6011	Compiler Design Lab	-	-	4	15	35	50	2
DC	CSDB6021	HADOOP and Big Data Analytics Lab	-	-	4	15	35	50	2
DE	**	Elective-II Lab	-	-	4	15	35	50	2
<b>Total</b>			<b>25</b>	<b>1</b>	<b>14</b>	<b>-</b>	<b>-</b>	<b>1000</b>	<b>32</b>

## Semester VII

Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSEB7010	Cryptography and Network Security	4	-	-	30	70	100	4
DC	CSEB7020	Mobile Computing	4	-	-	30	70	100	4
ISC	IBMB6010	Big Data Engineer (Mastery Badge)	2	-	2	-	-	150	3
DE	**	Elective-III	4	-	-	30	70	100	4
OE	**	Open Elective-II	3	-	-	30	70	100	3
DC	CSEB7011	Cryptography and Network Security Lab	-	-	4	15	35	50	2
DC	CSEB7021	Mobile Computing Lab	-	-	2	15	35	50	2
DC	CSEB7003	Internal Major Project & Seminar	-	-	-	-	-	200	6
DE	**	Elective-III Lab	-	-	4	15	35	50	2
<b>Total</b>			<b>17</b>	<b>0</b>	<b>12</b>	<b>-</b>	<b>-</b>	<b>900</b>	<b>30</b>

## Semester VIII

Course Type	Course Code	Course Name	L	T	P	IA	UE	Total Marks	Credit
DC	CSEB8010	Image Recognition and Processing	4	-	-	30	70	100	4
DE	**	Elective-IV	4	-	-	30	70	100	4
DE	**	Elective-V	4	-	-	30	70	100	4
DC	CSEB8003	IBM Remote mentored Project & Seminar	-	-	-	-	-	200	8
DE	**	Elective-IV Lab	-	-	4	15	35	50	2
DE	**	Elective-V Lab	-	-	4	15	35	50	2
<b>Total</b>			<b>12</b>	<b>0</b>	<b>8</b>	<b>-</b>	<b>-</b>	<b>600</b>	<b>24</b>

## 01 Ability Enhancement Mandatory Courses (AEMC)

Semester	Offering Department	Course Code	Course Name	(L-T-P)	Credits
I	Humanities	ENGG1000	English Communication	2-0-1	3
II	Basic Sciences	EVSG2000	Environmental Sciences	2-0-0	0

## List of Open Electives Papers (OE-1 to OE-4) offered by Department for students in B. Tech. in Allied Programmes

Semester	Course	Course Code (T)	Course Name	(L-T-P)	Credit
VI	Open Elective-I	CSEB6460	Cyber Law and Ethics	3-0-0	3
VI		HUMB7450	Introduction to Philosophical Thoughts	3-0-0	3
VII	Open Elective-II	HUMG8000	Economic Policies in India	3-0-0	3
VII		CIVB8210	Metro Systems and Engineering	3-0-0	3

**List of Discipline Specific Elective Papers (DE-1 to DE-5) offered by the Department for students in B. Tech Computer Science Engineering**

Semester	Course	Course Code (T+P)	Course Name	(L-T-P)	Credit
V	Elective-I	CSDB5310/1	Applied Statistical Analysis	4-0-2	4
V		CSIB5320/1	Introduction to Soft Computing	4-0-2	4
VI	Elective-II	CSIB6310/1	Parallel Processing & High Performance Computing	4-0-2	4
VI		CSIB6320/1	Cloud Computing	4-0-2	4
VII	Elective-III	CSDB7310/1	Introduction to Artificial Intelligence	4-0-2	4
VII		CSDB7320/1	Multidimensional Modelling of Data Warehousing	4-0-2	4
VIII	Elective-IV/V	CSDB8310/1	Data Privacy and IPR	4-0-2	4
VIII		CSDB8320/1	Advanced Data Visualization	4-0-2	4
VIII		CSDB8330/1	DevOps for Web Development	4-0-2	4
VIII		CSDB8340/1	Social, Web and Mobile Analytics	4-0-2	4