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**UNIVERSITY SCHOOL  
OF  
INFORMATION AND COMMUNICATION TECHNOLOGY**  
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
**PROGRAMME STRUCTURE**

**B.TECH. COMPUTER SCIENCE AND ENGINEERING  
SPECIALIZATION IN DATA SCIENCE**

**2023-2027**

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08.09.23



**GAUTAM BUDDHA UNIVERSITY**  
**GAUTAM BUDH NAGAR, GREATER NOIDA, UP, INDIA**

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## SEMESTER I

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CS101	Fundamentals of Computer Programming	3	1	0	4	CC1 / FC
2	CD101	Fundamentals of Data Science and MS Excel	2	0	0	2	CC2 / FC
3	MA101	Engineering Mathematics-I	3	1	0	4	GE1
4	PH102	Engineering Physics	3	1	0	4	GE2
5	EC101	Basic Electronics Engineering	3	1	0	4	GE3 / FC
6	EN101	English Proficiency	2	0	0	2	OE1 / AECC
7	CE103	Engineering Graphics Lab	1	0	2	2	GE-L1
8	PH104	Engineering Physics Lab	0	0	2	1	GE-L2
9	CS181	Computer Programming Lab	0	0	2	1	CC-L1 / SEC
10	EC181	Basic Electronics Engineering Lab	0	0	2	1	GE-L3
11	GP	General Proficiency	Non Credit				
Total Hours and Credits			17	4	8	25	

## SEMESTER II

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD102	Introduction to Python	2	0	0	2	CC3 / FC
2	CD104	Computer Organization and Architecture	3	0	0	3	CC4 / SEC
3	MA102	Engineering Mathematics-II	3	1	0	4	GE4
4	EE102	Basic Electrical Engineering	3	1	0	4	GE5
5	ME101	Engineering Mechanics	3	1	0	4	GE6
6	ES101	Environmental Studies	3	1	0	4	OE2 / AECC
7	CD182	Python Programming Lab	0	0	2	1	CC-L2 / SEC
8	EE104	Basic Electrical Engineering Lab	0	0	2	1	GE-L4
9	ME102	Workshop Practice	1	0	2	2	GE-L5
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			16	4	6	25	

08/09/23

2/6

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## SEMESTER III



S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD201	Internet Technology	3	0	0	3	CC5 / SEC
2	CD203	Operating Systems	3	0	0	3	CC6
3	CD205	Data Structure & Algorithms	3	0	0	3	CC7 / SEC
4	CD207	Optimization Problem for Data Science	3	0	0	3	CC8
5	CD209	Introduction to R Programming	3	0	0	3	CC9
6	MA201	Engineering Mathematics-III	3	1	0	4	GE7
7	CD281	R Programming Lab	0	0	3	2	CC-L3 / SEC
8	CD283	Data Structure & Algorithms Lab	0	0	3	2	CC-L4 / SEC
9	CD285	Internet Technology Lab	0	0	3	2	CC-L5 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

## SEMESTER IV

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD202	Software Engineering	3	0	0	3	CC10
2	CD204	Database Management System	3	0	0	3	CC11 / SEC
3	CD206	Java Programming	3	0	0	3	CC12
4	CD208	Artificial Intelligence	3	0	0	3	CC13
5	CD210	Theory of Automata	3	0	0	3	CC14
6	CD212	Data Handling and Visualization	3	1	0	4	CC15/SEC
7	CD282	Database Management System Lab	0	0	3	2	CC-L6 / SEC
8	CD284	Java Programming Lab	0	0	3	2	CC-L7 / SEC
9	CD286	Data Handling and Visualization Lab	0	0	3	2	CC-L8 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

08/09/23

3/6

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## SEMESTER V

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD301	Compiler Design	3	0	0	3	CC16 / AECC
2	CD303	Soft Computing Techniques	3	0	0	3	CC17
3	CD305	Analysis and Design of Algorithms	3	0	0	3	CC18
4	CD307	Big Data Analytics	3	0	0	3	CC19
5	CD309	Machine Learning	3	1	0	4	CC20 / SEC
6		Elective 1	3	0	0	3	E1 / DSE
7	CD381	Analysis and Design of Algorithms Lab	0	0	3	2	CC-L9 / SEC
8	CD383	Big Data Analytics Lab	0	0	3	2	CC-L10 / SEC
9	CD385	Machine Learning Lab using Python	0	0	3	2	CC-L11 / SEC
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

## SEMESTER VI

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD302	Web Development using PHP	3	0	0	3	CC21
2	CD304	Introduction to Statistical Learning	3	0	0	3	CC22
3	CD306	Operation Research in Data Science	3	1	0	4	CC23
4	CD308	Cloud Computing	3	0	0	3	CC24
5	CD310	Data Privacy and Database Security	3	0	0	3	CC25 / SEC
6		Elective 2	3	0	0	3	E2 / DSE
7	CD382	Web Development using PHP Lab	0	0	3	2	CC-L12
8	CD384	Statistical Learning Lab	0	0	3	2	CC-L13
9	CD386	Data Privacy and Database Security Lab	0	0	3	2	CC-L14
10	GP	General Proficiency	Non Credit				
Total Hours and Credits			18	1	9	25	

Industrial Training will be done by candidate individually after third year during the summer break and it will be of minimum 4 weeks. It will be evaluated as per University Examination in VII semester.

09/09/23

4/6

4/6

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## SEMESTER VII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD401	Parallel processing and CUDA programming	3	1	0	4	CC26
2	CD403	Cryptography and Network Security	3	0	0	3	CC27
3	CD405	Data Analytics using R	2	0	0	2	CC28 / SEC
4		Elective 3	3	0	0	3	E3 / DSE
5		Elective 4	3	0	0	3	E4 / DSE
6	CD481	Data Analytics using R Lab	0	0	3	2	CC-L15
7	CD491	Minor Project	0	0	10	5	MP1 / E
8	CD493	Industrial Traning	0	0	6	3	IT1 / E
9	GP	General Proficiency	Non Credit				
Total Hours and Credits			14	1	19	25	

## SEMESTER VIII

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD490	Seminar	0	0	3	2	S / E
2	CD492	Major Project	0	0	16	8	MP2 / E
3	CD494	Intenship	0	0	30	15	I / E
4	GP	General Proficiency	Non Credit				
Total Hours and Credits			0	0	49	25	

GRAND TOTAL OF CREDITS = 200

In the **Seminar**, student need to study and present individually, on latest research paper of their specialized area and It will be evaluated as per University Examination Rules.

The **Internship** in Industry will be done by candidate individually during the 8th semester and it will be for a minimum of 4 (-6) months. It will be evaluated as per University Examination Rules.

**Minor and Major Project** will be in a group and It will be evaluated as per University Examination Rules.

USICT will provide a mentor/supervisor for industrial training, seminar, internship, minor and major projects.

08/09/23

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## ELECTIVES FROM DCSE

S.No.	Course Code	Course Name	L	T	P	Credits	Types
1	CD311	Pattern Recognition	3	0	0	3	E1
2	CD313	Deep Learning	3	0	0	3	E1
3	CD315	Data Science Life Cycle	3	0	0	3	E1
4	CD317	Data Storage Technologies and Networking	3	0	0	3	E1
5	CD319	Internet of Things	3	0	0	3	E1
6	CD312	Big Data Platforms	3	0	0	3	E2
7	CD314	Research Techniques for Data Science	3	0	0	3	E2
8	CD316	High Performance Computing	3	0	0	3	E2
9	CD318	Data Mining	3	0	0	3	E2
10	CD320	Information Retrieval Systems	3	0	0	3	E2
11	CD407	Business Intelligence	3	0	0	3	E3
12	CD409	Computer Vision with Machine Learning	3	0	0	3	E3
13	CD411	Digital Image Processing	3	0	0	3	E3
14	CD413	Mobile and Wireless Network Security	3	0	0	3	E3
15	CD415	Quantum Computing	3	0	0	3	E3
16	CD417	SAS Programming	3	0	0	3	E4
17	CD419	Biomedical Image and signal processing	3	0	0	3	E4
18	CD421	AI Enabled Data Science	3	0	0	3	E4
19	CD423	Web Analytics	3	0	0	3	E4
20	CD425	Social Media Analytics and Techniques	3	0	0	3	E4

CD Computer Science &amp; Engineering / Data Science for Course Code

CC Core Course from USICT for course type

GE General Elective from related discipline of other Deptt./School

GE L General Elective Lab from related discipline of other Deptt./School

OE Open Elective from other discipline of other Deptt./School

AECC Ability Enhancement Compulsary Course

DSE Discipline Specific Course

SEC Skill Enhancement Course

E Elective from USICT

CC-L Core Course Lab from USICT

IT1 Industrial Training

MP Minor / Major Project

S Seminar

I Internship

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6/6

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Annexure 30.1.5