University of Madras
Chepauk, Chennai 600 005

Undergraduate Programme in Computer Science with Data Science

Syllabus for
B.Sc Computer Science with Data Science
(With effect from the Academic Year 2022 -23)

Learning Outcome Based Curriculum Framework

Note: The Committee is designed Learning Outcome Based Curriculum Framework of Undergraduate Computer Science Programmes prescribed by UGC

I   Preamble

Bachelor of Computer Science with Data Science is a 3 – Year Undergraduate Programme spread over six semesters. The course is designed to achieve a high degree of technical skills in Problem solving and Modern application development. The course develops requisite professional skills and problem solving along with developing the analytical abilities for pursuing a successful career in software industry and forms the required basics for further higher studies in Computer Science specifically in the area of Data Science.

ELIGIBILITY FOR ADMISSION:
Candidates for admission to the first year of the Degree of Bachelor of Science in Computer Science with Data Science Courses should have studied Mathematics at Higher Secondary level.

II Course Objectives

- Acquisition of Knowledge and understanding of systems, various programming languages and tools required for effective computation based problem solving and analysis.
- Utilize emerging technological tools learn, adapt and successfully engage effective procedural coding to meet the needs of technical and societal challenges
- Attain sufficient knowledge related to computer domains, render technical, soft and hard skills to apply them effectively in team work
- Empower the students with competencies in creative thinking and problem solving, interpersonal communication and managerial skills.

III Graduate Attributes

- Computational Knowledge
- Problem analysis & Solving
- Design & Development of Solutions
- Modern tool usage
- Communication skills
- Innovation & Entrepreneurship
- Societal & environmental concern
- Pragmatic Application of tools

IV Course Outcomes

After Completion of the course, the students are expected to

- Understand the basic principles and concepts of Computer Science and Data Science with an integrate the knowledge gained in the domain with practical needs of the society and be an ethically and socially responsible Professional
- Explore latest emerging technologies in diverse areas of Computer Science and inculcate skills for successful career, entrepreneurship and higher studies
- Apply the concepts of Computer and practices via emerging technologies and Software development tools to solve pragmatic social concerns.

Course Structure
B.Sc Computer Science with Data Science

SYLLABUS WITH EFFECT FROM 2022 -23

ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of Bachelor of Science in Computer Science with Data Science Courses should have studied Mathematics at Higher Secondary level.

S.NO.	PART	SUBJECT NAME	CREDITS	Lecture Hours	MAXIMUM MARKS		
					EXT. MKS	INT. MKS	TOTAL
		SEMESTER I					
1	I	Tamil/ Other languages – I	3	6	75	25	100
2	II	BP2-ENG01- Communicative English I	3	3	75	25	100
3	III	BCD-DSC01 - Introduction to Data Science	4	6	75	25	100
4	III	BCD-DSCP1 - Data Science using Python Lab	3	5	60	40	100
5	III	BMA-CSA01-Allied I: Mathematics-I@	5	6	75	25	100
6	IV	Basic Tamil/Advanced Tamil/NME I*	2	-	75	25	100
7	IV	BP4-EPSC01- English for Physical Science I	3	4	50	50	100
		Total Credits	**23**				
		SEMESTER II	CREDITS	Lecture Hour	EXT. MKS	INT. MKS	TOTAL
8	I	Tamil/ Other languages – II	3	6	75	25	100
9	II	BP2-ENG02- Communicative English II	3	3	75	25	100
10	III	BCE-CSC05 - Java and Data Structures@	4	6	75	25	100
11	III	BCE-CSC06 - Data Structures using Java Lab@	3	5	60	40	100
12	III	BMA-CSA02-Allied II: Mathematics II@	5	6	75	25	100
13	IV	Basic Tamil/Advanced Tamil/NME-II*	2	-	75	25	100
14	IV	BP4-EPSC02- English for Physical Science II	3	4	50	50	100
		Total Credits	**23**				
		SEMESTER III	CREDITS	Lecture Hour	EXT. MKS	INT. MKS	TOTAL
15	I	Tamil/ Other languages – III	3	6	75	25	100
16	II	BP2-ENG03-Language Through Literature- I	3	6	75	25	100
17	III	BCE-CSC11 - Relational Database Management System@	4	5	75	25	100
18	III	BCE-CSC13 - PL/SQL Lab@	3	3	60	40	100
19	III	BST-CSA01-Allied III-Statistics I@	5	8	75	25	100
20	IV	Soft Skill	3	2	50	50	100
21	IV	Environmental Studies	Examination will be held in Semester IV				
		Total Credits	**21**				

		SEMESTER IV	CREDITS	Lecture Hour	EXT. MKS	INT. MKS	TOTAL
22	I	Tamil/ Other languages – IV	3	6	75	25	100
23	II	BP2-ENG04- Language Through Literature - II	3	6	75	25	100
24	III	BCD-DSC04 - Data Analytics	4	5	75	25	100
25	III	BCD-DSCP4 - Data Analytics Lab	3	3	60	40	100
26	III	BST-CSA02- Allied IV- Statistics II@	5	8	75	25	100
27	IV	Soft Skill	3	2	50	50	100
28	IV	Environmental Studies	2	-	75	25	100
		Total Credits	**23**				
		SEMESTER V	CREDITS	Lecture Hour	EXT. MKS	INT. MKS	TOTAL
29	III	BCE-CSC10 - Operating Systems@	4	5	75	25	100
30	III	BCE-CSC09 - Computer Networks@	5	5	75	25	100
31	III	BCD-DSC07 - Data Visualization	4	5	75	25	100
32	III	BCD-DSCP5 - Data Visualization Lab	3	4	60	40	100
33	III	Elective I-Choose any one from the list@	5	5	75	25	100
34	III	Practical VI :Elective 1 Lab@	3	4	60	40	100
35	IV	Value Education	2	2	75	25	100
		Total Credits	**26**				
		SEMESTER VI	CREDITS	Lecture Hour	EXT. MKS	INT. MKS	TOTAL
36	III	BCE-CSC16 – Introduction to Cloud Computing@	4	6	75	25	100
37	III	BCE-CSE2B – IOT and its Applications@	5	6	75	25	100
38	III	BCD-CSC10 - Machine Learning@	4	6	75	25	100
39	III	BCD-CSCP6 - Machine Learning Lab@	3	3	60	40	100
40	III	Elective II-Choose any one from the list@	5	5	75	25	100
41	III	BCE-CSC18 – Mini Project@	5	4**	60	40	100
42	V	Extension Activities	1				
		Total Credits	**27**				
		Total credits (Core, Elective, SBS)	**143**				

Non Major Elective I - I Semester
*NME: Choose Any one From the Other Department

Non Major Elective II – II Semester
*NME: Choose Any one From the Other Department

Elective I
BCD-CSE1A - Natural Language Processing@
BCD-CSE1B - Mobile Application Development for Machine Learning@
BCD-CSE1C - Introduction to Reinforcement Learning@
BCD-CSEP1A - Natural Language Processing Lab@
BCD-CSEP1B - Mobile Application Development for Machine Learning Lab@
BCD-CSEP1C - Introduction to Reinforcement Learning Lab@

Elective II
BCD-CSE2A - Information Security@
BCD-CSE2B - Network Security@
BCE-CSE2C - Block Chain Technology@

@ - Common subject of other course/s.

** - (Lab Hours for Development of Mini Project [External project optional])