CURRICULUM & SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

BACHELOR OF TECHNOLOGY (B.Tech.)

(4 Year Undergraduate Degree Programme)

IN

COMPUTER SCIENCE AND ENGINEERING

In Data Science and Artificial Intelligence in association with IBM
[w. e. f. 2021-2022]

FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY DELHI-NCR, SONEPAT
39, Rajiv Gandhi Education City, Sonepat
Haryana-131029

COURSE CURRICULUM

BACHELOR OF TECHNOLOGY

(COMPUTER SCIENCE AND ENGINEERING)

SPECIALIZATION: DATASCIENCE & ARTIFICIAL INTELLIGENCE

DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – I

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21AS101	Engineering Mathematics-I	BAS	3	1	0	4	4
21AS102/ 21AS103	Engineering Physics/ Engineering Chemistry	BAS	3	1	0	4	4
21EE101/ 21EC101	Basic Electrical Engineering / Basic Electronics Engineering	ES	3	0	0	3	3
1CAM1001	Software Foundation using C	PC	3	0	0	3	3
21CS103	Discrete Structures	PC	3	1	0	4	4
21HS101/ 21HS102	Communicative English/ Indian Constitution & Polity	HSS	2	0	0	2	2
21AS152/ 21AS153	Engineering Physics Lab/ Engineering Chemistry Lab	BAS	0	0	2	2	1
21EE151/ 21EC151	Basic Electrical Engineering Lab / Basic Electronics Engineering Lab	ES	0	0	2	2	1
21CAM1111	Software Foundation Lab	P/W	0	0	2	2	1
21HS151/ 21SE151	Communicative English Lab/ NSS-Yoga-NCC	HSS	0	0	2	2	1
21ME152/ 21ME153	Mechanical Workshop Lab/Engineering Graphics & Design Lab	ES	0	0	2	2	1
TOTAL			**17**	**3**	**10**	**30**	**25**

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PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – II

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21AS201	Engineering Mathematics-II	BAS	3	1	0	4	4
21AS202/ 21AS203	Engineering Physics/ Engineering Chemistry	BAS	3	1	0	4	4
21EE201/ 21EC201	Basic Electrical Engineering / Basic Electronics Engineering	ES	3	0	0	3	3
21ME201	Basic Mechanical Engineering	ES	3	0	0	3	3
21CAM1004	Programming With Java	PC	2	0	0	2	2
21HS201/ 21HS202	Communicative English/ Indian Constitution & Polity	HSS	2	0	0	2	2
21AS252/ 21AS253	Engineering Physics Lab/ Engineering Chemistry Lab	BAS	0	0	2	2	1
21EE251/ 21EC251	Basic Electrical Engineering Lab / Basic Electronics Engineering Lab	ES	0	0	2	2	1
21ME251	Basic Mechanical Engineering Lab	ES	0	0	2	2	1
21HS251/ 21SE251	Communicative English Lab/ NSS-Yoga-NCC	HSS	0	0	2	2	1
21ME252/ 21ME253	Mechanical Workshop Lab/Engineering Graphics & Design Lab	ES	0	0	2	2	1
21CAM1114	Programming with Java Lab	P	0	0	2	2	1
TOTAL			**16**	**2**	**12**	**30**	**24**

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DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – III

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
xxx	Open Elective Course – I	OE	2	0	0	2	2
21AS301	Engineering Mathematics-III	BAS	3	1	0	4	4
21CAM2009	Python Programming	PC	2	0	0	2	2
21CS2001	Data Structures Using C	PC	3	0	0	3	3
21CS2005	Database Management Systems	PC	3	0	0	3	3
21CS2007	Computer Architecture & Organization	PC	3	1	0	4	4
21SS351	Effective Communication Skills	SEC	0	0	2	2	1
21CAM2115	Python Programming Lab	P	0	0	2	2	1
21CS2113	Data Structures Using C lab	P	0	0	2	2	1
21CS2111	Database Management Systems Lab	P	0	0	2	2	1
21CAM2117	Industry Session : Data Science	P	0	0	2	2	1
21CS0201	Essentials of BlockChain and IoT - Level I	SEC	0	0	2	2	1
TOTAL			**16**	**2**	**12**	**30**	**24**

NOTE: At the end of the semester, students will undergo a training and create a project which will be evaluated in the next semester (Live Project-I)

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DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – IV

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Xxx	Open Elective Course – II	OE	2	0	0	2	2
21CAM2004	Cloud Application Development	PC	3	0	0	3	3
21CAF2006	Agile Development Methodology	PC	3	0	0	3	3
21CS2004	Theory of Computation	PC	3	1	0	4	4
21CS2006	Operating Systems	PC	3	0	0	3	3
21CS2008	Analysis and Design of Algorithms	PC	3	0	0	3	3
21SS452	Teamwork & Interpersonal Skills	SEC	0	0	2	2	1
21CAM2120	Cloud Application Development Lab	P	0	0	2	2	1
21CAF2118	Agile Development Lab	P	0	0	2	2	1
21CS2114	Operating Systems Lab	P	0	0	2	2	1
21CS2118	Analysis and Design of Algorithms Lab	P	0	0	2	2	1
21CS0202	Artificial Intelligence and Machine Learning – Level-II	SEC	0	0	2	2	1
21CS0204	Live Project-I and Industrial Visit	LP**	0	0	2	2	1
TOTAL			**17**	**1**	**14**	**32**	**25**

NOTE: At the end of the semester, students will undergo a training and create a project which will be evaluated in the next semester (Live Project-II)

**** To be evaluated in current semester.**

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COMPUTER SCIENCSE AND ENGINEERING

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DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – V

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21XXX	Open Elective Course-III	OE	3	0	0	3	3
21CAM3001	Machine Learning Using R	PC	3	0	0	3	3
21CAF3005	Essentials of Hadoop	PC	2	0	0	2	2
21CS3001	Compiler Design	PC	3	1	0	4	4
21CS3003	Computer Networks	ES	3	1	0	4	4
21SS553	Presentation & Speaking Skills	SEC	0	0	2	2	1
21CAM3115	Machine Learning Using R Lab	P	0	0	2	2	1
21CAF3113	Hadoop Lab	P	0	0	2	2	1
21CS3113	Computer Network Lab	P	0	0	2	2	1
21CS3117	Compiler Design Lab	P	0	0	2	2	1
21CS0301	Design Thinking and Augmented Virtual Reality- Level-II & Level-III	SEC	0	0	2	2	1
21CS0303	Live Project-II & Industrial Visit	LP**	0	0	2	2	1
TOTAL			**14**	**2**	**14**	**30**	**23**

NOTE: At the end of the semester, students will undergo a training and create a project which will be evaluated in the next semester (Live Project-III)

**** To be evaluated in current semester.**

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DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – VI

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21CAM3002	Artificial Intelligence	PC	3	0	0	3	3
21CAF3010	NoSQL and MongoDB	PC	3	0	0	3	3
21CS3004	Software Engineering	PC	3	0	0	3	3
21CS3xxx	Professional Elective Course– I	PE	3	1	0	4	4
21BS301	Management and Organizational Behavior	HSS	3	0	0	3	3
21SS655	Professional Writing Skills	SEC	0	0	2	2	1
21CAM3116	Artificial Intelligence Lab	P	0	0	2	2	1
21CAF3012	NoSQL and MongoDB Lab	P	0	0	2	2	1
21CS3118	Software Engineering lab	P	0	0	2	2	1
21CAM3014	Industry Session : Deep Learning	P	0	0	2	2	1
21CS0302	Big Data Analytics, Tools and Techniques- Level-III	SEC	0	0	2	2	1
21CS0304	Live Project-III & Industrial Visit	LP**	0	0	2	2	1
TOTAL			**15**	**1**	**14**	**30**	**23**

NOTE: At the end of the semester, students will undergo a training and create a project which will be evaluated in the next semester (Live Project-IV)

**** To be evaluated in current semester.**

BACHELOR OF TECHNOLOGY

(COMPTER SCIENCE AND ENGINEERING)

SPECIALIZATION: DATASCIENCE & ARTIFICIAL INTELLIGENCE

DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – VII

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21CAM4003	Quantum Computing	PC	3	1	0	4	4
21CAF4005	Data Science (Predictive Analysis)	PC	3	1	0	4	4
21CS4xxx	Professional Elective Course– II	PE	3	1	0	4	4
21CAM4007	Quantum computing Lab	P	0	0	2	2	1
21CAF4009	Data Science Lab	P	0	0	2	2	1
21CAM4011	Industry Session : BlockChain	P	0	0	2	2	1
21SS756	Interpersonal Skills : Strategies	SEC	0	0	2	2	1
21CS4115	Live Project-IV & Industrial Visit	LP**	0	0	2	2	1
21CS4117	Minor Project	LP	0	0	8	8	4
TOTAL			**9**	**3**	**18**	**30**	**21**

**** To be evaluated in current semester.**

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DEGREE COURSE

PROGRAMME COURSES SRUCTURE SEMESTER WISE

SEMESTER – VIII

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
21CS4114	**Major Project**	LP	0	0	24	24	12

* *To be monitored at the Institute Level*

***Teaching Load*

LIST OF SKILL ENHANCEMENT COURSES

Course Code	Course	Category	L	T	P	Credits
TECHNICAL TRAINING						
21CS0201	Essentials of Blockchain and IoT-Level -I	SEC	0	0	2	1
21CS0202	Artificial Intelligence and Machine Learning – Level- II	SEC	0	0	2	1
21CS0301	Design Thinking and Augmented Virtual Reality –Level-II&III	SEC	0	0	2	1
21CS0302	Big Data Analytics, Tools and Technique-Level –III	SEC	0	0	2	1
SOFT SKILL						
21SS351	Effective Communication Skills	SEC	0	0	2	1
21SS452	Teamwork & Interpersonal Skills	SEC	0	0	2	1
21SS553	Presentation & Speaking Skills	SEC	0	0	2	1
21SS655	Professional Writing Skills	SEC	0	0	2	1
21SS756	Interpersonal Skills : Strategies	SEC	0	0	2	1

LIST OF OPEN ELECTIVE COURSES –

COURSES FROM OTHER TECHNICAL AREA & EMERGING FIELDS

Course Code	Course	Category	L	T	P	C
Open Elective-I(OPEC-I)						
21FLGR301	German Language Phase-I	OE	2	0	0	2
21FLFR301	French Language Phase-I	OE	2	0	0	2
Open Elective-II (OPEC-II)						
21FLGR401	German Language Phase-II	OE	2	0	0	2
21FLFR401	French Language Phase-II	OE	2	0	0	2
Open Elective-III (OPEC-III)						
SEC-FT-01	Entrepreneurship and New Venture Management	OE	3	0	0	3
21ESUG202	Sustainable Growth and Development	OE	3	0	0	3
21ESUG203	Waste Management	OE	3	0	0	3
21EC390	Microprocessor and Interfacing	OE	3	0	0	3

LIST OF PROFESSIONAL ELECTIVE COURSES

Course Code	Course	Category	L	T	P	C
Professional Elective-I						
21CS3020	Distributed Operating System	PE	3	1	0	4
21CS3024	Software Project Management	PE	3	1	0	4
21CS3026	Grid Computing	PE	3	1	0	4
21CS3028	Object Oriented Analysis & Design	PE	3	1	0	4
21CS3030	Neural Networks & Fuzzy Logic	PE	3	1	0	4
21CS3032	Cyber Security	PE	3	1	0	4
21CS3034	Design Thinking	PE	3	1	0	4
21CS3038	Business Intelligence	PE	3	1	0	4
21CS3040	Internet of Things	PE	3	1	0	4
Professional Elective-II						
21CS4019	Network Security & Cryptography	PE	3	1	0	4
21CS4033	Software Testing	PE	3	1	0	4
21CS4023	Wireless Adhoc and Sensor Network	PE	3	1	0	4
21CS4035	Advanced Java Programming	PE	3	1	0	4
21CS4037	NASSCOM Associate Analytics – II	PE	3	1	0	4
21CS4025	Data Warehousing & Data Mining	PE	3	1	0	4
21CS4027	Mobile Computing	PE	3	1	0	4
21CS4031	Open Source Software	PE	3	1	0	4
21CS4039	NASSCOM Associate Analytics – III	PE	3	1	0	4