

CURRICULUM & SYLLABUS



SRM
UNIVERSITY
DELHI-NCR, SONEPAT

CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

BACHELOR OF TECHNOLOGY (B.Tech.)

(4 Year Undergraduate Degree Programme)

IN

**COMPUTER SCIENCE & ENGINEERING WITH
SPECIALIZATION IN CLOUD ENGINEERING & DEVOPS
AUTOMATION IN ASSOCIATION WITH XEBIA**

(In Alignment with National Education Policy 2020)

[w. e. f. 2023-2024]

FACULTY OF ENGINEERING AND TECHNOLOGY

SRM UNIVERSITY DELHI-NCR, SONEPAT

**39, Rajiv Gandhi Education City, Sonapat
Haryana-131029**

BACHELOR OF TECHNOLOGY

**(COMPUTER SCIENCE & ENGINEERING WITH SPECIALIZATION IN CLOUD ENGINEERING &
DEVOPS AUTOMATION IN ASSOCIATION WITH XEBIA)**

DEGREE COURSE

PROGRAMME CREDIT STRUCTURE ALONG WITH CREDITS

Table 4.1

<div> <div>SEMESTERS →</div> <div>COURSES ↓</div> </div>	CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL	%AGE
BASIC APPLIED SCIENCE	BAS	09	09	-	-	-	-	-	-	18	9.67
ENGINEERING SCIENCE	ES	09	09	-	-	04	-	-	-	22	11.82
PROFESSIONAL CORE	PC	-	-	13	09	10	06	07	06	51	27.41
PROGRAM ELECTIVE	PE	-	-	04	04	03	11	07	03	32	17.20
ABILITY ENHANCEMENT COURSES	AEC	02	05	-	-	-	-	-	-	7	3.76
SKILL ENHANCEMENT COURSES (TECHNICAL & SOFT SKILLS)	SEC	-	-	02	02	02	02	01	-	9	4.83
VALUE ADDED COURSES	VAC	02	02	02	-	-	-			6	3.22
PRACTICALS/WORKSHOPS	P/W	-	-	03	03	02	02	02	-	12	6.45
LIVE PROJECT & INDUSTRIAL VISIT	LP	-	-	-	01	01	01	05	12	20	10.75
MULTI-DISCIPLINARY (HUMANITIES AND SOCIAL SCIENCES COURSES) COURSES	MDC	-	-	-	03	03	03	-	-	9	4.83
TOTAL		22	25	24	22	25	25	22	21	186	100

* If the students opted 22 credits in I semester, then II semester must to be opting 25 credits and vice versa.

Table 4.2

SEMESTERS → COURSES ↓	CATEGORY	I	II	III	IV	V	VI	VII	VIII	TOTAL	%AGE
BASIC APPLIED SCIENCE	BAS	09	09	-	-	-	-	-	-	18	9.67
ENGINEERING SCIENCE	ES	09	09	-	-	04	-	-	-	22	11.82
PROFESSIONAL CORE	PC	-	-	13	09	10	06	07	06	51	27.41
PROGRAM ELECTIVE	PE	-	-	04	04	03	11	07	03	32	17.20
ABILITY ENHANCEMENT COURSES	AEC	05	02	-	-	-	-	-	-	7	3.76
SKILL ENHANCEMENT COURSES (TECHNICAL & SOFT SKILLS)	SEC	-	-	02	02	02	02	01	-	9	4.83
VALUE ADDED COURSES	VAC	02	02	02	-	-	-	-	-	6	3.22
PRACTICALS/WORKSHOPS	P/W	-	-	03	03	02	02	02	-	12	6.45
LIVE PROJECT & INDUSTRIAL VISIT	LP	-	-	-	01	01	01	05	12	20	10.75
MULTI-DISCIPLINARY (HUMANITIES AND SOCIAL SCIENCES COURSES) COURSES	MDC	-	-	-	03	03	03	-	-	9	4.83
TOTAL		25	22	24	22	25	25	22	21	186	100

* If the students opted 25 credits in I semester, then II semester must to be opting 22 credits and vice versa.

BACHELOR OF TECHNOLOGY

**(COMPUTER SCIENCE & ENGINEERING WITH SPECIALIZATION IN CLOUD ENGINEERING &
DEVOPS AUTOMATION IN ASSOCIATION WITH XEBIA) DEGREE COURSE**

TABLE5: PROGRAMME COURSES CREDIT SRUCTURE SEMESTERWISE

SEMESTER – I

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23AS101	Engineering Mathematics-I	(BAS)	3	1	0	4	4
23AS102 / 23AS103	Engineering Physics / Engineering Chemistry	(BAS)	3	1	0	4	4
23EE101 / 23E C101	Basic Electrical Engineering / Basic Electronics Engineering	(ES)	3	0	0	3	3
23ME101 / 23CS101	Engineering Mechanics / Fundamentals of Computer & C Programming	(ES)	3	0	0	3	3
23AEC101	Professional English (*50% of students will be offered)	(AEC)	2*	0	0	2*	2*
23AEC102/23AEC103 / 23AEC104	Hindi-I/German-I/French-I	(AEC)	2	0	0	2	2
23VAC101 / 23VAC102	Environmental BioEngineering / Indian Constitution and Polity	(VAC)	2	0	0	2	2
Total Credits (Theory)			16/18	2	0	18/20	18/20
Practical							
23AS152 / 23AS153	Engineering Physics Lab / Engineering Chemistry Lab	(BAS)	0	0	2	2	1
23EE151 / 23E C151	Basic Electrical Engineering Lab / Basic Electronics Engineering Lab	(ES)	0	0	2	2	1
23ME151 / 23 CS151	Basic Mechanical Engineering Lab / C Programming Lab	(ES)	0	0	2	2	1
23ME152 / 23 ME153	Mechanical Workshop Lab / Engineering Graphics & Design Lab	(ES)	0	0	2	2	1
23AEC151*	Communication English Lab (50% of students will be offered)	(AEC)	0	0	2*	2*	1*
Total Credits (Practical)			0	0	8/10	8/10	4/5
Total Credits (Theory + Practical)			16/18	2	8/10	26/30	23/25

SEMESTER – II

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS	
			L	T	P	TOTAL HOURS		
Theory								
23AS0201	Engineering Mathematics-II	(BAS)	3	1	0	4	4	
23AS0202 / 23AS0203	Engineering Physics/Engineering Chemistry	(BAS)	3	1	0	4	4	
23EE0201 / 23EC0201	Basic Electrical Engineering / Basic Electronics Engineering	(ES)	3	0	0	3	3	
23ME0201 / 23CS0201	Engineering Mechanics / Fundamentals of Computer & C Programming	(ES)	3	0	0	3	3	
23AEC0201	Professional English (*50% of students will be offered)	(AEC)	2*	0	0	2*	2*	
23AEC202 / 23AEC203 / AEC204	Hindi-II/German-II/French-II	(AEC)	2	0	0	2	2	
23VAC201 / 23VAC202	Environmental BioEngineering / Indian Constitution and Polity	(VAC)	2	0	0	2	2	
Total Credits (Theory)			16/18	2	0	18/20	18/20	
Practical								
23AS0252 / 23 AS0253	Engineering Physics Lab / Engineering Chemistry Lab	(BAS)	0	0	2	2	1	
23EE0251 / 23EC0251	Basic Electrical Engineering Lab / Basic Electronics Engineering Lab	(ES)	0	0	2	2	1	
23ME251 / 23 CS251	Basic Mechanical Engineering Lab / C Programming Language Lab	(ES)	0	0	2	2	1	
23ME0251 / 21ME0252	Mechanical Workshop Lab / Engineering Graphics & Design Lab	(ES)	0	0	2	2	1	
23AEC151*	Communication English Lab (50% of students will be offered)	(AEC)	0	0	2*	2*	1*	
Total Credits (Practical)			0	0	8/10	8/10	4/5	
Total Credits (Theory + Practical)			16/18	2	8/10	26/30	23/25	

COURSE CURRICULUM**BACHELOR OF TECHNOLOGY****(COMPUTER SCIENCE& ENGINEERING WITH SPECIALIZATION IN CLOUD ENGINEERING &
DEVOPS AUTOMATION IN ASSOCIATION WITH XEBIA) DEGREE COURSE****PROGRAMME COURSES SRUCTURE SEMESTERWISE****SEMESTER – III**

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23CD202	Advanced Linux	PC	2	0	1	3	3
23CS2001	Data Structures Using C	PC	3	0	0	3	3
23CS2005	Database Management Systems	PC	3	0	0	3	3
23CSPExxx	Professional Elective – I	PE	3	1	0	4	4
23CD201	Source Code Management & Development Automation	PC	3	1	0	4	4
Total Credits (Theory)			14	2	1	17	17
Practical							
23CS2111	Database Management Systems Lab	P	0	0	2	2	1
23CS2113	Data Structures Using C Lab	P	0	0	2	2	1
23CD215	Source Code Management & Development Automation Lab	P	0	0	2	2	1
23VAC301	Sports, Yoga and Fitness	VAC	1	0	2	3	2
Total Credits (Practical)			1	0	8	9	5
Skill Enhancement Course							
	Digital Marketing	SEC	0	0	2	2	1
23SS351	Effective Communication Skills	SEC	0	0	2	2	1
Total Credits (Skill Enhancement)			0	0	4	4	2
Total Credits (Theory + Practical+ Skill Enhancement)			15	02	13	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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PROGRAMME COURSES SRUCTURE SEMESTERWISE

SEMESTER – IV

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23MDCxxx	Multidisciplinary Elective-I	MDC	3	0	0	3	3
23CSPExxx	Professional Elective – II	PE	3	1	0	4	4
23CS2006	Operating Systems	PC	3	0	0	3	3
23CSPE2008	Analysis and Design of Algorithms	PC	3	0	0	3	3
23CD204	Build and Release Management	PC	3	0	0	3	3
Total Credits (Theory)			15	1	0	16	16
Practical							
23CS2114	Operating Systems Lab	P	0	0	2	2	1
23CSPE2118	Analysis and Design of Algorithms Lab	P	0	0	2	2	1
23CD214	Build and Release Management Lab	P	0	0	2	2	1
23CS0204	Live Project-I & Industrial Visit	LP**	0	0	2	2	1
Total Credits (Practical)			0	0	8	8	4
Skill Enhancement Course							
	Introduction to SPSS	SEC	0	0	2	2	1
23SS452	Teamwork & Interpersonal Skills	SEC	0	0	2	2	1
Total Credits (Skill Enhancement)			0	0	4	4	2
Total Credits (Theory + Practical+ Skill Enhancement)			15	01	12	28	22

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)

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PROGRAMME COURSES SRUCTURE SEMESTERWISE

SEMESTER – V

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23MDCxxx	Multidisciplinary Elective-II	MDC	3	0	0	3	3
23CDPExx	Professional Elective – III	PE	3	0	0	3	3
23CSPE3001	Compiler Design	PC	3	1	0	4	4
23CSPE3003	Computer Networks	ES	3	1	0	4	4
23CD301	Continuous Integration and Continuous Deployment	PC	3	0	0	3	3
23CD303	Agile Practices	PC	3	0	0	3	3
Total Credits (Theory)			18	2	0	20	20
Practical							
23CSPE3117	Compiler Design Lab	P	0	0	2	2	1
23CD311	Continuous Integration and Continuous Deployment Lab	P	0	0	2	2	1
23CS0303	Live Project – II & Industrial Visit	LP**	0	0	2	2	1
Total Credits (Practical)			0	0	6	6	3
Skill Enhancement Course							
	Introduction to Hardware Description Language	SEC	0	0	2	2	1
23SS553	Presentation Skills	SEC	0	0	2	2	1
Total Credits (Skill Enhancement)			0	0	4	4	2
Total Credits (Theory + Practical+ Skill Enhancement)			18	02	10	30	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-III)

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

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PROGRAMME COURSES SRUCTURE SEMESTERWISE

SEMESTER – VI

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23CD302	Test Automation	PC	3	0	0	3	3
23CD304	Application Containerization	PC	3	0	0	3	3
23CDPExxx	Professional Elective-IV	PE	3	0	0	3	3
23CDPExxx	Professional Elective-V	PE	3	1	0	4	4
23CSPExxx	Professional Elective-VI	PE	3	1	0	4	4
23MDCxxx	Multidisciplinary Elective-III	MDC	3	0	0	3	3
Total Credits (Theory)			18	2	0	20	20
Practical							
23CD312	Test Automation Lab	P	0	0	2	2	1
23CD314	Application Containerization Lab	P	0	0	2	2	1
23CS0304	Live Project – III & Industrial Visit	LP**	0	0	2	2	1
Total Credits (Practical)			0	0	6	6	3
Skill Enhancement Course							
	Wearable Technologies	SEC	0	0	2	2	1
23SS551A	Professional Skills	SEC	0	0	2	2	1
Total Credits (Skill Enhancement)			0	0	4	4	2
Total Credits (Theory + Practical + Skill Enhancement)			18	02	10	30	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-IV)

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

COURSE CURRICULUM

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PROGRAMME COURSES SRUCTURE SEMESTERWISE

SEMESTER – VII

COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23CD401	System Provisioning and Configuration Management	PC	3	0	0	3	3
23CS4003	Cloud Computing	PC	3	1	0	4	4
23CDPExxx	Professional Elective – VII	PE	3	0	0	3	3
23CDPExxx	Professional Elective – VIII	PE	3	1	0	4	4
Total Credits (Theory)			12	2	0	14	14
Practical							
23CS4113	Cloud Computing Lab	P	0	0	2	2	1
23CS4115	Live Project – IV & Industrial Visit	LP	0	0	2	2	1
23CD411	System Provisioning and Configuration Management Lab	P	0	0	2	2	1
23CS4117	Minor Project	LP	0	0	8	8	4
Total Credits (Practical)			0	0	14	14	7
Skill Enhancement Course							
23AR755	Aptitude and Reasoning	SEC	0	0	2	2	1
Total Credits (Skill Enhancement)			0	0	2	2	1
Total Credits (Theory + Practical+ Skill Enhancement)			12	02	16	30	22

COURSE CURRICULUM**BACHELOR OF TECHNOLOGY****(COMPUTER SCIENCE& ENGINEERING WITH SPECIALIZATION IN CLOUD ENGINEERING &
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COURSE CODE	COURSE	CATEGORY	HOURS PER WEEK				CREDITS
			L	T	P	TOTAL HOURS	
Theory							
23CD402	System Monitoring	PC	3	0	0	3	3
23CD404	Applied DevOps	PC	3	0	0	3	3
23CDPE4xx	Professional Elective – IX	PE	3	0	0	3	3
Total Credits (Theory)			9	0	0	9	9
Practical							
23CS4114	Major Project	LP	0	0	24	24 (12)	12
Total Credits (Practical)			0	0	24	12	12
Total Credits (Theory + Practical+ Skill Enhancement)			09	00	24	21	21

LIST OF PROFESSIONAL ELECTIVES

SPECIALIZATION-I

Subject Code	Course	Category	L	T	P	C
Professional Elective -I						
23CSPE2007	Computer Architecture and Organization	PE	3	0	0	3
Professional Elective -II						
23CSPE2004	Theory of Computation	PE	3	0	0	3
Professional Elective -III						
23CDPE321	Python Programming	PE	3	0	0	3
23CDPE323	Big Data Overview	PE	3	0	0	3
Professional Elective –IV						
23CDPE322	Supervised Learning	PE	3	0	0	3
23CDPE324	Domain-Driven Approach to Design And Implement Microservices	PE	3	0	0	3
Professional Elective –V						
23CSPE3002	AI and Expert Systems	PE	3	0	0	3
Professional Elective –VI						
23CSPE3020	Distributed Operating System	PE	3	1	0	4
23CSPE3032	Cyber Security	PE	3	1	0	4
23CSPE3028	Object Oriented Analysis & Design	PE	3	1	0	4
23CSPE3030	Neural Networks & Fuzzy Logic	PE	3	1	0	4
Professional Elective –VI						
23CSPE3026	Grid Computing	PE	3	1	0	4
23CSPE3036	Predictive Analytics	PE	3	1	0	4
23CSPE3038	Business Intelligence	PE	3	1	0	4
23CSPE3040	Internet of Things	PE	3	1	0	4
Professional Elective –VII						
23CDPE421	Digital Product Engineering and Design Thinking	PE	3	0	0	3
23CDPE423	Software Craftsmanship Overview	PE	3	0	0	3

Subject Code	Course	Category	L	T	P	C
Professional Elective –VIII						
23CS4019	Network Security & Cryptography	PE	3	1	0	4
23CS4023	Wireless Adhoc and Sensor Network	PE	3	1	0	4
23CS4035	Advanced Java Programming	PE	3	1	0	4
23CS4025	Data Warehousing & Data Mining	PE	3	1	0	4
Professional Elective –IX						
23CDPE422	Modern Architecture Patterns	PE	3	0	0	3
23CDPE424	Modern Web and Mobile Frameworks	PE	3	0	0	3

SPECIALIZATION-II

Subject Code	Course	Category	L	T	P	C
Professional Elective - I						
23CSPE2007	Computer Architecture and Organization	PE	3	0	0	3
Professional Elective - II						
23CSPE2004	Theory of Computation	PE	3	0	0	3
Professional Elective - III						
23CDPE321	Python Programming	PE	3	0	0	3
23CDPE323	Big Data Overview	PE	3	0	0	3
Professional Elective – IV						
23CDPE322	Supervised Learning	PE	3	0	0	3
23CDPE324	Domain-Driven Approach to Design And Implement Microservices	PE	3	0	0	3
Professional Elective – V						
23CSPE3002	AI and Expert Systems	PE	3	0	0	3
Professional Elective – VI						
23CSPE3026	Grid Computing	PE	3	1	0	4
23CSPE3036	Predictive Analytics	PE	3	1	0	4
23CSPE3038	Business Intelligence	PE	3	1	0	4
23CSPE3040	Internet of Things	PE	3	1	0	4
Professional Elective – VII						
23CDPE421	Digital Product Engineering and Design Thinking	PE	3	0	0	3
23CDPE423	Software Craftsmanship Overview	PE	3	0	0	3
Professional Elective – VIII						
23CSPE4027	Mobile Computing	PE	3	1	0	4
23CSPE4031	Open Source Software	PE	3	1	0	4
23CSPE4041	Advanced Internet of Things	PE	3	1	0	4
23CSPE4047	Advanced Block Chain	PE	3	1	0	4

Subject Code	Course	Category	L	T	P	C
Professional Elective – IX						
23CDPE422	Modern Architecture Patterns	PE	3	0	0	3
23CDPE424	Modern Web and Mobile Frameworks	PE	3	0	0	3

LIST OF ABILITY ENHANCEMENT COURSES

Course Code	Course	Category	L	T	P	Credits
23AEC101/23AEC151	Professional English/Communicative English Lab	AEC	2	0	2	3
23AEC102/23AEC103/ 23AEC104	Hindi-I/French-I/ German-I	AEC	2	0	0	2
23AEC202/ 23AEC203/ 23AEC204	Hindi-II/French-II/ German-II	AEC	2	0	0	2

LIST OF SKILL ENHANCEMENT COURSES

Course Code	Course	Category	L	T	P	Credits
TECHNICAL TRAINING						
	Digital Marketing	SEC	0	0	2	1
	Introduction to SPSS	SEC	0	0	2	1
	Introduction to Hardware Description Language	SEC	0	0	2	1
	Wearable Technologies	SEC	0	0	2	1
SOFT SKILL						
23SS351	Effective Communication Skills	SEC	0	0	2	1
23SS452	Teamwork & Interpersonal Skills	SEC	0	0	2	1
23SS553	Presentation Skills	SEC	0	0	2	1
23SS654	Professional Skills	SEC	0	0	2	1
23AR755	Aptitude and Reasoning	SEC	0	0	2	1

LIST OF VALUE-ADDED COURSES

Course Code	Course	Category	L	T	P	C
23VACXX	Environment BioEngineering	VAC	2	0	0	2
23VACXX	Indian Constitution and Polity	VAC	2	0	0	2
23VACXX	Sports, Yoga and Fitness	VAC	2	0	0	2

LIST OF MULTIDISCIPLINARY COURSES (HUMANITIES & SOCIAL SCIENCES COURSES) (HSS)

Code	Category	Course	L	T	P	C
23MDCXXX / 23MDCXXX / 23MDCXXX / 23MDCXXX / 23MDCXXX	MDC-I	Statistical Methods Environmental Geosciences & Disaster Management IPR in Business Library Information Sciences and Media Literacy Management Process & Organizational Behaviour	3	0	0	3
23MDCXXX / 23MDCXXX / 23MDCXXX / 23MDCXXX / 23MDCXXX	MDC-II	Photonics Chemistry & Society Psychology and Emotional Intelligence Indian Economy Creating an Entrepreneurial Mind	3	0	0	3
23MDCXXX / 23MDCXXX / 23MDCXXX / 23MDCXXX	MDC-III	Life Sciences & Public Health Electoral Literacy in India Personal Financial Planning Interior Design	3	0	0	3