ACADEMIC CURRICULA

UNDERGRADUATE INTEGRATED POST GRADUATE DEGREE PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume - 1

(Revised on July 2024)



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)
Kattankulathur, Chengalpattu District 603203,
Tamil Nadu, India



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

52. Integrated M.Tech. in Computer Science and Engineering with Specialization in Data Science

52. (a) Mission of the Department

Mission Stmt – 1	To impart knowledge in cutting edge Computer Science and Engineering technologies in par with industrial standards.
Mission Stmt – 2	To collaborate with renowned academic institutions to uplift innovative research and development in Computer Science and Engineering and its allied fields to serve the needs of society
Mission Stmt – 3	To demonstrate strong communication skills and possess the ability to design computing systems individually as well as part of a multidisciplinary teams.
Mission Stmt – 4	To instill societal, safety, cultural, environmental, and ethical responsibilities in all professional activities
Mission Stmt – 5	To produce successful Data Science graduates with personal and professional responsibilities and commitment to lifelong learning

52. (b) Program Educational Objectives (PEO)

PEO – 1	Graduates will be able to demonstrate their knowledge in technical/managerial roles with right skills and aptitude in software industries and R&D sectors
PEO – 2	Graduates will possess the proficiencies and additional skills in core computer science and engineering discipline in par with industry requirements.
PEO – 3	Graduates will be able to successfully pursue higher education in reputed institutions and also extend their research career.
PEO – 4	Graduates will be self-empowered solution providers and entrepreneurs in Computer Science and Engineering
PEO – 5	Graduates will possess the ability to adapt, contribute and innovate new technologies and systems in the key domains of Data Science

52. (c) Mission of the Department to Program Educational Objectives (PEO) Mapping

2	Mission Stmt 1	Mission Stmt 2	Mission Stmt 3	Mission Stmt 4	Mission Stmt 5
PEO - 1	3	Transfer out	The second	de la	1
PEO - 2			2		-
PEO - 3		3	3	100	
PEO - 4	- 100	T 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	N Latin	2	3
PEO - 5		3	3	2	3

^{3 –} High Correlation, 2 – Medium Correlation, 1 – Low Correlation

52. (d) Mapping Program Educational Objectives (PEO) to Program Outcomes (PO)

		J.	1		Pro	gram Ou	tcomes (PO)				لأسمر	Prog	Program Speci				
	1	2	3	4	5	6	7	8	9	10	-11	12	Outo	comes (P	SO)			
	Engineering Knowledge	Problem Analysis	Design/development of solutions	Conduct investigations of complex problems	Modern Tool Usage	The engineer and society	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO-1	Z-0Sd	PSO-3			
PEO - 1	3		_ ~ .	1	1	2	ı	3	2	3			3	3	3			
PEO - 2	-	2	2		3	-	3	2	-10			-	3	3	3			
PEO - 3	-	3	3	2					-	2	-	3	3	3	3			
PEO - 4	-	2	3	-	1	3	2	1	2	-	2	2	3	3	3			
PEO - 5	3	1	-	-	3	3	1	2	-	3	3	3	3	3	3			

^{3 -} High Correlation, 2 - Medium Correlation, 1 - Low Correlation

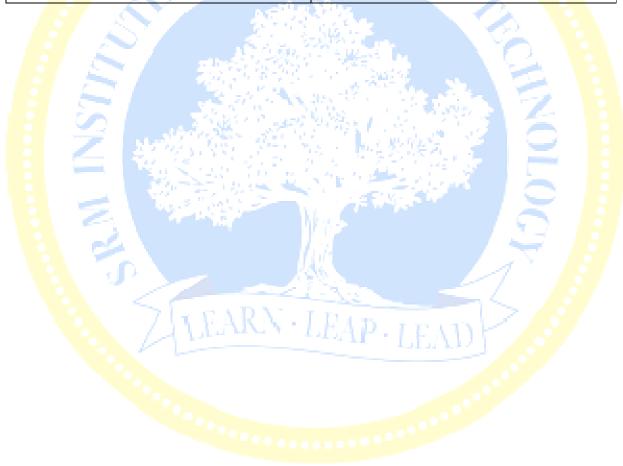
PSO - Program Specific Outcomes (PSO)

150 Ilog	ann speeme outcomes (150)
1 PSU-1	To understand, analyse, design, and develop computing solutions by applying fundamental concepts of computer science and engineering.
PSO - 2	To apply computing principles, skills and practices to develop solutions using logical and reasoning skills for real life problems.
PSO - 3	Ability to understand the requirements, gather a large amount of data, analyze, utilize the tools to extract insights to increase the productivity and efficiency of the business along with better visual representations.

52. (e) Program Structure: Integrated M.Tech. in Computer Science and Engineering with Specialization in Data Science

	Humanities & Social Sciences						Basic Science Courses (B)				
	including Management Courses (H)					Course	Course		ours		
Course	Course		lour			Code	Title	١.	Veel		
Code	Title		Wee					L	Т	Р	С
211 FH101T	Communicative English	2	1	P 0	3 3		Semiconductor Physics and Computational Methods	3	1	2	5
	Chinese			U	J	21CYB101J		3	1	2	5
	French						Calculus and Linear Algebra	3	1	0	4
	German					21MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
	Japanese	2	1	0	3		Transforms and Boundary Value Problems		1	0	4
	Korean						Probability and Statistics	3	1	0	4
	Spanish						Discrete Mathematics	2	0	0	2
21LEH108T	Philosophy of Engineering	1	0	2	2	218181021	Introduction to Computational Biology		Cre	-	
	Social Engineering	2	0	0	2	N. 1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Jiai	CIE	นแจ	JZ
	Behavioral Psychology	2	1	0	3	17 6	Hara Carlo				
2.0/		Total			_						
	Engineering Science Courses (S)						Professional Core Courses (C)				
Course		Н	lours	s/		Course		Н	lours	3/	
Course Code	Course Title	\	Nee			Course Code	Course Title	١	Nee	_	
		L	T	Р	С			L	Т	Р	С
	Electrical and Electronics Engineering	3	1	0	4	21CSC101T			1	0	3
	Basic Civil and Mechanical Workshop	0	0	4	2	21CSC201J		3	0	2	4
	Engineering Graphics and Design Programming for Problem Solving	0	0	4	2	21CSC202J		3	0	2	4
	Fundamentals of Data Science	3	2	2	5	21CSC204J 21CSC205P		3	0	2	4
	Design Thinking and Methodology	1	2	0	3			2	1	0	3
	Full Stack Development	1	1	0	2		Advanced Object Oriented Programming	2	1	0	3
210000011		Total	Cre	•		21CSC301T	Formal Language and Automata	3	0	0	3
	The state of the s	-	7		T	21CSC302J		3	0	2	4
Drainet We	rk, Seminar, Internship in Industry / Hi	ahar'	Taal	hnia	ما	21CSC303J	Software Engineering and Project	2	0	2	3
Project wo	Institutions (P)	gnei	I C C	IIIIIC	aı		Management		Ĭ		
		Н	ours	/		21CSC304J	Compiler Design	2	0	2	3
Course	Course		/eek			21CSC307P		3	1	0	3
Code	Title	L	T	Р	С	21CSC502T 21CSC501T	Applied Deep Learning Natural Language Processing Techniques		1	0	4
21GNP301L			0	2	1	21IPC501J ²		2	1	2	4
21CSP302L	,		0	6	3	2111 00010			Cre	dits	
21CSP303T			0	0			Non Credit Courses (M)		-		
21CSP401L				30 20	15		` '	L	lours	s /	
21CSP402L 21CSP403L				10	10 5	Course	Course		Nee		
21CSP501L				40	20	Code	Title	L	Τ	Р	С
21CSP502L			0	30	15	21PDM101L	Professional Skills and Practices	0	0	2	
21CSP503L		-	0		5		General Aptitude	0	0	2	
		otal (39		1 Verbal Reasoning	0	0	2	0
							1 Critical and Creative Thinking Skills	0	0	2	
	Open Elective Courses						Analytical and Logical Thinking Skills Employability Skills and Practices	0	0	2	
	(Any 4 Courses)						Employability Skills and Practices 1 Environmental Science	0	0	2	0
Course	Course		lour				¹ Constitution of India	1	0	0	0
			Wee				Universal Human Values – Introduction	1	0	0	0
Code	Title	L	T		С		Professional Ethics	1	0	0	0
	Web Programming	2	1		3		Universal Human Values-II:		Ė		É
	Python Programming Mobile Application Development	2	1		3	21LEM202T	Understanding Harmony and Ethical	2	1	0	3
	Mobile Application Development Data Analytics	2			3		Human Conduct				
210303041		∠ Total					1 Indian Art Form	1	0	0	0
		Jul	J10	-unto	12		1 Indian Traditional Knowledge	1	0	0	0
							Physical and Mental Health using Yoga National Sancias Schome				
							National Service Scheme National Cadet Corps	0	0	2	0
							National Cadel Corps National Sports Organization				
						_ I OI III I O IL		otal	Cre	dits	03
1						11					

	Professional Elective Courses (E) (Any 13 Courses)						Professional Elective Courses (E)				
Course Code	Course Title		ours Vee		С	Course Code	Course Title		ours Vee		С
21CSE222T	Big Data Tools and Techniques	3	0	0	3	21CSE427T	Augmented and Virtual Reality	2	1	0	3
	Computer Architecture	3	0	0	3		Healthcare Analytics	2	1	0	3
21CSE253T	Internet of Things	2	1	0	3		Data Science for Internet of Things	2	1	0	3
21CSE251T	Digital Image Processing	3	0	0	3	21CSE447T	Robot Motion Planning	2	1	0	3
21CSE321T	Data Warehousing and Data Mining	2	1	0	3	21CSE448T	Bio-inspired computing and Fuzzy Logic	2	1	0	3
21CSE322T	Multivariate Techniques for Data Analytics	2	1	0	3		Business Intelligence and Analytics	2	1	0	3
21CSE323T	Marketing Analytics	2	1	0	3	21CSE430T	Automatic Speech Recognition	2	1	0	3
21CSE359T	Information Storage and Management	2	1	0	3	21CSE449T	Risk Analytics	2	1	0	3
21CSE325T	Applied Social Network Analysis	2	1	0	3	21CSE521T	Advanced Algorithms Analysis	2	1	0	3
21CSE326T	Artificial Neural Networks	3	0	0	3	21CSE522T	Functional Programming	2	1	0	3
21CSE373T	Streaming Analytics	2	1	0	3	21CSE524T	Computer Vision Techniques	2	1	0	3
21CSE425T	Advanced Machine Learning	2	1	0	3	21CSE527T	Text Mining and Analytics	2	1	0	3
	Cloud Computing for Data Analytics	2	1	0	3	21CSE529T	Web Intelligence	2	1	0	3
21CSE422T	Convolutional Neural Networks	2	1	0	3		T	otal	Cre	dits	39
21CSE426T	Financial Machine Learning	2	1	0	3		921	Te		<u> </u>	



52. (f) Programme Articulation: Integrated M.Tech.in Computer Science and Engineering with Specialization in Data Science

5 <u>J</u>	pecialization in Data Science					Dro~-	ram O	utcom	ne /D	<u>Ο</u>)					Dev	
		1	2	3	4	Progr 5	am O	uccon 7	1 es (P	9	10	11	12	1	PSO 2	3
Course Code	Course Name	Engineering Knowledge	Problem Analysis	Design/development of solutions	of .	Ф	The engineer and society	Environment & Sustainability -	Ethics	Individual & Team Work	Communication =	Project Mgt. & Finance	Life Long Learning	PSO-1	PSO-2	PSO-3
21CSS101J	Programming for Problem Solving	2	3	-	-		-	-	_	-	-	-	2	-	3	-
	Data Science	-	-	-	-	-	-		-	_	-	-	-	1	1	-
	Computer Organization and Architecture	3	2	-	-	-	-	-	-	-	-	-	-	1	2	1
	Data Structures and Algorithms	2	3	3	1	-	-	-		4	1	h-	-	1	1	2
	Object Oriented Design and Programming	-	2	2	J - [2	-	-	•	,	þ	-	3	-	2	2
	Design and Analysis of Algorithms	2	1	- 2	1	7	1	4	1		3	-	3	3	1	-
	Ope <mark>rating System</mark> s	3	3	3	2	-	7	-	4	-	-	-	3	2	-	-
	Software Engineering and Project Management	-	3	2	-	-	-	34	-	2	-	2	٠.	3	-	-
	Advanced Programming Practice	3	2	2	1	2	-	-	-4	1	-	-	-	2	-	-
	Formal Language and Automata	2	2	2	-	-	-	-	-	-	3	-	-	-	3	-
	Computer Networks	3	-	-	2	3	-	-	-	- ,	7		- 1	1	-	-
	Database Management Systems	3	2	2	1-5		-	-	-	<u> </u>			-	2	1	-
	Artificial Intelligence	1	2	-3	75			-	-	-	-	_	-	1	2	-
	Malware Analysis	-	2	350	- 1	-	-	2	-	-	3	-	3	-	-	3
	Security Risk Management Principles	-	3	-	-27	- 3	-	-	-	-	-	3		-		3
	Applied Deep Learning	2	3	-3		4.74	-	-		٠,	-		_=	1	2	3
	Natural Language Processing Techniques Security Risk Management Principles	-	3	1		-	-				-	-	2	-	-	3
	Cryptography and Network Security	2	2	H	15		-	- 1	-	H-		-		-		3
	Information Security	2	-	2	177	v		1	2			-	_	4		3
21CSE283T				-	-	2	- RV	2	-			-	_			3
	Check Point System Administration	-	-	2	-	2			4	- 1	_	_	_	-		3
	Security Management	-	-	2	-	2		-		-4	_	-	-	-		3
	Security Governance, Risk and compliance	2	2	-	2		_				_	-		_		3
21CSF384J	Security Audit and Risk Assessment	-	2	2	-	-	1,97	-	2	_	_	-		-	-	3
	Advanced Malware Analysis	-	2	2	-4	2		-	-	-	-	-,4	-	-	- 1	3
21CSE3861	Penetration Testing and Vulnerability Assessment	-	2	2	-	2	1	-	•	-	1	1	-	-		3
210 <mark>3E3013</mark>	Hacker Techniques, Tools, and Incident Handling	-	2		-	2	-	-	-	-	۲.	1	y -	7	-	3
	Comprehensive Linux for All	3		2	2	3	-	-	-	7		<i>-</i>	-	/- 1	b - 1	-
	Database Security	-	2	<u> </u>	7.	2	-	-	2		2			-	- 1	3
	Operation System Security	2	-	_3	-	3	-	-		-	-	7-3-			1	3
	Cyberwarfare	3,	-	2	/	- 35	-	-	2	rīs.	Ŀ	-	-	.	-	3
	Hacker Mind: Profiling the IT Criminal	-	-	2	-5	2	-	-		1-1	-	3	-	- 4	-	3
	Mobile and Wireless Security	2	-	3	-	3	-	-4			_ـــ	-	-	-	-	3
	Windows and Linux Internals	-	-	2	-	-	-	-	2	-		-	- 1	-	-	3
	Cyber Crimes and Cyber Security	-	2	2	-	-	-	-	2		3	-	- 3	-	-	3
	Cyber Secu <mark>rity Operations Network Management and Protocols</mark>	-	3	-	-	3	-	2		-	J	3	J	-	-	3
	Firewalls and Access Controls	-	<u>J</u>	-	-	-	-	2			3	J		-	-	3
	Network Programming and Management	-	3	-	-	-	-			-	J		2	-	-	3
	Network Programming and Management Network Intrusions and Computer Forensics	2	2		-	-	· = *	_		-		_	_	-	-	3
	Mobile Forensics	-	-	2	-	-	_		2	-	-	-	-	-	-	3
	Digital Forensics	-	-	_	-	2	-	2		-	-	_	-	-	-	3
	Security Scripting and Analysis	_		2	-	<u> </u>	-	-	2	-	-	_	-	_	-	3
	Principles of Secure Coding Principles	-	-	2	-	2	-	-	-	-	-	-	-	-	-	3
	Android Security and Design Internals	2	2	-	2	-	-	-	-	-	-	-	-	-	-	3
21CSP302L		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
21CSP303T	MOOC	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Major Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21CSP402L	Internship	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Specialization Project	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
21CSP502L	Semester Internship-II	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Program Average	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

52. (g) Implementation Plan: Integrated M.Tech.in Computer Science and Engineering with Specialization in Data Science

	Someoter I					i	Comostor II				=
	Semester – I	ш	ours	. /			Semester - II	L	our	. /	П
Course	Course		ours Veel			Course	Course		ours Vee		
Code	Title	1			_	Code	Title	_ \	T	к Р	_
241 EU404T	Communicative English	2	T 1	P 0	C 3	241 EU102T	Chinese	L	1	Р	С
21LEH101T				_		21LEH102T		1			
21MAB101T		3	1	0	4	21LEH103T	French	-			
21PYB102J	Semiconductor Physics and	3	1	2	5	21LEH104T	German				_
0414504001	Computational Methods	^	^	-	0	21LEH105T	Japanese	2	1	0	3
21MES102L	3 - 3 - 7 3	0	0	4	2	21LEH106T	Korean				
21EES101T		3	1	0	4	21LEH107T	Spanish				
21CSS101J		3	0	2	4		Russian	_	_	_	
21CYM101T		1	0	0	0		Philosophy of Engineering	1	0	2	2
21PDM101L		0	0	2	0	21MAB102T	Advanced Calculus and Complex	3	1	0	4
21LEM101T		1	0	0	0		Analysis		_		_
		otal	Cre	dits	22	21CYB101J	Chemistry	3	1	2	5
	Semester – III					21BTB102T	Introduction to Computational Biology	2	0	0	2
	•	Н	ours	s /		21CSC101T	Object Oriented Design and	2	1	0	3
Course	Course		Nee				Programming				
Code	Title	L	Т	Р	С	21MES101L ¹	Basic Civil and Mechanical Workshop	0	0	4	2
0414450047	Transforms and Boundary Value	_	,				General Aptitude*	0	0	2	0
21MAB201T	Problems	3	1	0	4		Physical and Mental Health using Yoga				
	Fundamentals of Data Science	3	2	0	5		National Service Scheme	0	0	2	0
	Data Structures and Algorithms	3	0	2	4		National Cadet Corps	ľ	ľ	_	
	Operating Systems	3	0	2	4	21GNM104L ¹	National Sports Organization				
	Advanced Object Oriented Programming	2	1	0	3		To	otal	Cre	dits	21
	Design Thinking and Methodology	1	2	0	3		Semester – IV				
	Professional Ethics	1	0	0	0			Н	ours	s /	
	Verbal Reasoning	0	0	2	0	Course	Course	١	Nee	k	
ETT BINEOTE		otal	·		-	Code	Title	L	Τ	Р	С
	■ 10 07 C. USA	otu.	<u> </u>			21MAB301T	Probability and Statistics	3	1	0	4
					1		Design and Analysis of Algorithms	3	0	2	4
	Semester – V					21CSC205P 1	Database Management Systems	3	1	0	4
	Semester – v	ш	ours	. /			Artificial Intelligence	2	1	0	3
Course	Course		Nee			Е	Professional Elective – I				3
Code	Title	-	T	P	С	21PDH209T 1	Social Engineering	2	0	0	2
211111 D202T	Discrete Mathematics	3	1	0	4	21PDM202L 1	Critical and Creative Thinking Skills	0	0	2	0
	Formal Language and Automata	3	0		3	-	Universal Human Values-II:				
		3	0	2	4	21LEM202T 1	Understanding Harmony and Ethical	2	1	0	3
	Computer Networks Machine Learning for Data Analytics	2	1	0	3		Human Conduct				
			ı	U	3		To	otal	Cre	dits	23
<u>E</u>	Professional Elective – II						Semester – VI				믁
•	Open Elective – I	0	Λ	2	3		Jeniester – VI	Ть	lours	- /	\Box
	Community Connect Analytical and Logical Thinking Skills	0	0	2	0	Course	Course		Nee		
						Code	Title			Р	С
21LEM3011 1	Indian Art Form		0				Full Stack Development	1	1		2
	I	otal	cre	aits	21		Software Engineering and Project	2	0	2	3
						21CSC303J	Management	2	U	2	J
	Semester - VII					21CSC304J	Compiler Design	2	0	2	3
Course	Course	Н	ours	s /		E	Professional Elective – III		U		3
Course Code	Title	_ \	Nee			E	Professional Elective – IV				3
		L	Т	Р	С	0	Open Elective – II				3
21GNH401T	Behavioral Psychology	2	1	0	3			Λ	0	6	J
Ε	Professional Elective – V				3		Project	0	0	6	3
Ε	Professional Elective – VI				3	21CSP303T 1	MOOC	3	0	0	0
Ε	Professional Elective – VII				3	21PDM302L 1	Employability Skills and Practices	0	_	2	0
Е	Professional Elective – VIII				3	21LEM302T ¹	Indian Traditional Knowledge	7	0	0	0
0	Open Elective –III				3			οταί	∪re	uits	20
		otal	Cre	dits	18						
						1					

					Semester - VIII				
				Course Code	Course Title		Hour Wee		С
				21CSC502T	Applied Deep Learning	3	1	0	4
				21CSC501T	Natural Language Processing Techniques	3	1	0	4
				21IPC501J ²	Research Methodology	2	1	2	4
				21CSP401L	Major Project	0	0	30	15
				21CSP402L	Major Project	0	0	20	10
				21CSP403L	Internship	0	0	10	5
						Tota	l Cre	dits	27
	Semester - IX				Semester - X				
Course Code	Course Title	ours Veel T	С	Course Code	Course Title		Hour Wee		С
Е	Professional Elective – IX		3	21CSP501L	Specialization Project	0	0	40	20
L	1 TOTOGOTOTIAI ETOGITO BY		•	040005004				30	15
E	Professional Elective – X		3	21CSP502L	Specialization Project	0	0	30	10
E E			3	21CSP502L 21CSP503L	Specialization Project Domain Internship	0	0	10	5
E E E	Professional Elective – X		3				0	10	5
E E E	Professional Elective – X Professional Elective – XI		3 3			0	0	10	5
E E E	Professional Elective – X Professional Elective – XI Professional Elective – XII Professional Elective – XIII Open Elective-IV		3	21CSP503L		0	0	10	5

#Students have to register either 21CSP401L or 21CSP402L and 21CSP403L both in eighth semester and either 21CSP501L or 21CSP502L and 21CSP503L in tenth semester





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