

Programme Template

1. Name of the Programme and Code	BTech and MTech in Computer Science and Engineering, CS5
2. Degree (UG/PG)	PG
3. Minimum Duration of the Programme (Specify for FT and PT, if applicable)	5 years (FT)
4. Maximum Duration of the Programme (Specify for FT and PT, if applicable)	7 years (FT)
5. Capacity (Max. Student Strength) of the Programme	37
6. Number of Regular Faculty Members Involved as Teaching Faculty in the Programme	All CSE Faculty
7. Minimum Credit Requirements for the Degree	182
8. Articulate the Program Learning Outcomes (PLO) <i>[For example see: Objectives vs. Outcomes and Student Outcomes]</i> PLO1. Demonstrate mastery in the core knowledge areas of computer science and engineering. PLO2. Develop a system-level perspective while understanding the nature of abstraction in the context of computing systems. PLO3. Develop the ability to solve problems within computing contexts and to devise computing-based solutions to real-world problems. PLO4. Gain a wide exposure to computing systems and applications. PLO5. Develop ability to understand, critically analyze and apply research in computer science through project and thesis-based activities.	

9. Map PLOs with Institute Learning Outcomes (ILOs) of the Degree					
[Indicate ‘1’ for weak, ‘2’ for good, and ‘3’ for excellent relation. Leave the cell blank to indicate no relation]					
	PLO1	PLO2	PLO3	PLO4	PLO5
ILO1	3	3	3	1	3
ILO2	3	3	3	2	3
ILO3	3	1	2	3	3
ILO4	1	3	1	3	3
10. Number of Programme Core Credits			34 Foundational Core + 19 Sub-Discipline Track (SDT) Core ¹ + 2 M.Tech. Core		
11. Number of Programme Elective Credits			8 DE (BTech) + 20 PE (MTech)		
12. Number of Open Credits			3 OC + 6 OE		
13. Number of Project Core Credits			27		
14. Details of Creative Expression and Ethical Reasoning (CEER) Component in the Programme [Mandatory for UG]					
Number of Credits Assigned			2.6 Cr in DFC, rest to be made up in SDT Core		
Courses Involved and Credits Accounted [e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]			1. COL2010 (0.2 credits) 2. COL2016 (0.1 credits) 3. COL2031 (0.4 credits) 4. COL2034 (1.9 credits)		
15. Details of Emerging Trends (ETT) Component in the Programme [Mandatory for UG]					
Number of Credits Assigned			4.5 credits in DFC		
Courses Involved and Credits Accounted [e.g., If one module in AMLXXX with			1. COL1015 (0.3 credits) 2. COL2010 (4 credits)		

<i>contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]</i>	3. COL2016 (0.2 credits)
16. Details of Environment and Sustainability (E&S) Component in the Programme [Mandatory for UG]	
Number of Credits Assigned	3.5 credits in DFC rest to be made up in SDT core
Courses Involved and Credits Accounted <i>[e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]</i>	1. COL1015 (0.5 credits) 2. COP2090 (3 credits)
17. Details of Research/Technical Communication Component in the Programme [Mandatory for PG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted <i>[e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]</i>	1. COD 8901 (3 credits) 2. COD 8904 (7 credits) 3. COD 8905 (14 credits)
18. Details of Professional Ethics Component in the Programme [Mandatory for PG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted <i>[e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then write AMLXXX (Z credits)]</i>	0.5 credit in COL 7001 0.5 credits in COD 7001
19. Details of External Connect Component in the Programme [Mandatory for PG]	
Number of Credits Assigned	
Courses Involved and Credits Accounted <i>[e.g., If one module in AMLXXX with contact hours YY satisfies Z credits, then</i>	Summer Internship (3 credits)

<i>write AMLXXX (Z credits)</i>			
20. List of prescribed courses in all baskets (BS, GE, DC/PC, DE/PE, ...)			
Basic Sciences (BS)	General Engineering (GE)	Departmental/Programme Core (DC/PC)	Departmental/Programme Elective (DE/PE)
Intro to Electrodynamics	Computer Literacy	COL1002 Discrete Mathematics	
	Introduction to Programming I	COL2015 Algorithm Design and Analysis	
	Introduction to Programming II	COL1015 Digital Logic and System Design	
	Programming with Data Structures	COL2016 Computer Architecture	
	Probability and Stochastic Processes	COL2026 Programming Languages	
	Signals and Systems	COL2010 Data Science	
	Engineering Visualization	COL2031 Operating systems	
	Manufacturing for Product Innovation	COL2034 Networks	

		COP2090 Design Practices	
		Minor Project (COD8901)	
		MTP1 (COD8904)	
		MTP2 (COD8905)	
		COL 7001, Systems Concepts, 2-0-0	
		COD 7001, Cornerstone Project, 0-0-6	
		At least one 3-credit or higher course from at least 3 of the Sub-Discipline Tracks (SDT) listed below (any course can only be counted towards one of the tracks)	
		SDT1: Algorithms and Complexity	
		Advanced Algorithms	
		Cryptography	
		Quantum Computing	
		Theory of Computing	
		SDT2: Programming	

		Languages and Formal Methods	
		Introduction to Automated Reasoning	
		Logic for Computer Science	
		SDT3: Data Science and AI	
		Introduction to Data Management	
		Data Mining	
		Fundamentals of Machine Learning	
		Introduction to Artificial Intelligence	
		SDT4: Architecture and Embedded Systems	
		Architecture of High-Performance Computers	
		SDT5: Computing Systems	
		Modern Internet Architectures	
		Introduction to Parallel and Distributed	

		Computing	
		Network and System Security	
		SDT6: Visual Computing	
		Computer Graphics	
		Digital Image Analysis	
		Foundations of Visual Computing	
		SDT7: Computing and Society	
		Introduction to Ethical Issues in Computer Science	
		Computational Social Choice	
		Introduction to Information and Communication Technologies for Development	
21. Nominal Semester-wise Academic Plan [<i>An example is provided below</i>]			

Sem.	Course 1	Course 2	Course 3	Course 4	Course 5	Course 6	Cour se 7	Lectu re Cour ses	L	T	P	Total hours	Credi ts
I	COL0100 0-0-2	COL0101 1-0-1	MCP107 0.5-0-3	MTL1001 3-1-0	PYL0 2-1-0	MCP110 1 0.5-0-3	CYP 0-0-4	5	7	2	13	22	15.5
II	COL0102 1-0-1	ELL2205 3-1-0	COL1002 3-0-0	MTL1002 3-1-0	CML 2-1-0		PYP 0-0-4	5	12	3	5	20	18.5
III	COL1101 3-0-2	GE4 2-4	COL1015 3-0-2	MTL1106 3-1-0	COL2010 3-0-2	HUL2X 3-1-0		6	17- 19	2	6	25-27	22- 24
IV	COP2090 1-0-6	COL2051 3-1-0	COL2016 3-0-2	COL2026 3-0-2	SBL 2-1-0	HUL2X 3-1-0		6	15	3	10	28	23
V	COL2034 3-0-2	COL 2031 3-0-2	SDT1 3-4	SDT2 3-4	HUL3X 3-1-0			5	15	1	4-8	20-24	18- 20
VI	SDT3 3-4	SDT4 3-4	SDT5 3-4	OC1 3	HUL3X 3-1-0			5	15	1	0-6	16-22	16- 19
VII	DE1 4	DE2 4	COL 7001 2-0-0	PE1 3-4	PE2 3-4			5	14	0	4-8	18-22	16- 18
Winte r			COD 7001 0-0-6					0	0	0	6	6	3
VIII	PE3 3-4	PE4 3-4	PE5 3-4	OE1 3				4	12	0	0-6	12-18	12- 15
Sum mer	Summer Internship/COD 8901 0-0-6							0	0	0	6	6	3
IX	PE6 3-4			COD8904 0-0-14	CON 8000 0-0-8			1	3	0	14- 16	20-22	13- 14
X	COD890 5 0-0-28	OE2 3			CON 8000 0-0-8			1	3	0	28	31	17

24. If the program is a revision of an existing program, please list the major changes made.	Yes, revision of CS5 programme. Major changes: Following the guidance of the ACM/IEEE/AAAI 2023 curriculum, we have broken the core into two parts: Foundational Core (DFC) and Sub-Discipline tracks (SDT). The DFC is common to all students whereas the SDTs provide breadth across different areas within the discipline and give the student options to go deeper within specific areas. This redesign is in keeping with the notion of flexibility emphasised in the Institute Curriculum Concept Note and well-aligned with the expansion and evolution of the discipline and the technology scenario in the area of Computing. New core courses have been added in emerging areas: Data Science, Cryptography, Quantum Computing and Advanced Algorithms. A new SDT on Computing and Society has been created since the department has developed adequate faculty strength in this area
25. Please elaborate on,	
a) how flexibility for the students has increased?	More flexibility in choices of core courses.

b) how engagement and interaction with the student have increased?	Reducing the core and introducing the idea of a broad soft core divided into SDTs is a design choice aimed at getting the students to engage at a deeper level with faculty in the areas of their own interest.
c) how hands-on learning is emphasized in the program?	Through project related courses and extensive assignments in most core courses.