

**B.Tech. (Computer Science & Engineering)**  
**Component wise distribution**

<b>Main Curriculum Components</b>	<b>Sub Components</b>	<b>Approved Credits for B.Tech.</b>	<b>Approved Credits Range</b>	<b>Proposed Credits for B.Tech. by Department</b>	<b>Proposed Credits Range</b>
<b>Institute Core Course</b>	HSSC	5	52-58	5	53
	HSSEC	6		6	
	MC	3		3	
	BSC	12-20		16	
	ESC	8-20		12	
	DSC	4		4	
	ESSC	3		3	
	TM	4		4	
<b>Program Core Course</b>	CCCC	40-48	87-91	40	88
	AI/ML	2		2	
	Engg. Analysis and design (design thinking based project)/Industry Oriented Problem Solving/ Lab based Project/ Practical Problem/ Case study	4		4	
	Technical Communication	2		2	
	BTP/Entrepreneurship/ Project-based internship/PEC	6-10		10	
	PEC	22-26		24	
	TEB	6-8		6	
	OEC	9-12		9-12	
CORE	2	2	2	2	
	Total	<b>150-160</b>		<b>152-155</b>	
	MSC/DHC	<b>18/20</b>		<b>18/20</b>	
	Grand Total			<b>170-175</b>	

**DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**Program Code** : 114            **B.Tech. (Computer Science &Engineering)**  
**Department** : CSE            **Computer Science &Engineering**

**Teaching Scheme**

<b>Year</b>	<b>Credits in Autumn Semester</b>	<b>Credits in Spring Semester</b>	<b>Credits (Year – wise)</b>
1	23	17	40
2	23/24	23/24	46/48
3	24/25	20	44/45
4	16	6	22
<b>Grand Total</b>			<b>152-155</b>
<b>Total with MSC/DHC</b>	With addition 18-20 credits		<b>170-175</b>

<b>Non-Credit Elements (NCE)</b>	<b>Components</b>	<b>Maximum Units</b>	<b>Minimum Units</b>	<b>Comments</b>
	<b>Discipline (DIS)</b>	<b>16</b>	<b>8</b>	To be evaluated by DoSW
	<b>NCC/NSS/NSO</b>	<b>8</b>	<b>4</b>	To be evaluated by DoSW
	<b>Internship (INT)</b>	<b>24</b>	<b>8</b>	1-week internship= 1 unit (to be coordinated by the deptt. /Centres/School)
	<b>Participation in professional development programs by Industry experts/ field experts (PPD-1 &amp; PPD-2)</b>	<b>8</b>	<b>4</b>	To be coordinated by the departments/Centres/school (2 <sup>nd</sup> & 3 <sup>rd</sup> Years)
<b>Minimum non-credit units to be earned: 24</b>				









**List of Program Elective Courses/ Departmental Honors Courses**

Teaching Scheme					Contact Hours/Week			Exam. Duration		Relative Weight (%)				
S.No.	Subject Code	Course Title	Subject Area	Credits	L	T	P	Theory	Practical	CWS	PRS	MTE	ETE	PRE
1.	CSL-371	Artificial Intelligence	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
2.	CSL -372	Computer Graphics	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
3.	CSL -373	Probability Theory for Computer Engineers	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
4.	CSL -381	Information Retrieval	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
5.	CSL-382	Machine Learning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
6.	CSL-374	Software Testing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
7.	CSL-5xx	Software-Defined Networking and Applications	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
8.	CSL-5xx	Computer Vision	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
9.	CSL-376	Parallel and Distributed Algorithms	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
10.	CSL-476	Software Project Management	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
11.	CSL-377	Bioinformatics	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
12.	CSL-380	Intrusion Detection Systems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
13.	CSL-3xx	Quantum Computation	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
14.	CSL-510	Network Programming	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
15.	CSL-511	Advanced Database Management Systems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
16.	CSL-512	Formal Methods and Software Verification	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
17.	CSL-513	Information and Network Security	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
18.	CSL-514	Advanced Automata Theory	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
19.	CSL-515	Data Mining and Warehousing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
20.	CSL-4xx	Modelling and Simulation	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
21.	CSL-517	Advanced Topics in Software Engineering	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
22.	CSL-518	Logic and Automated Reasoning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-



23.	CSL-519	Social Network Analysis	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
24.	CSL-520	Cloud Computing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
25.	CSL-521	Mobile and Pervasive Computing	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
26.	CSL-3xx	Advanced Graph Theory	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
27.	CSL-523	Computational Geometry	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
28.	CSL-524	Algorithms and Foundations of Chip Design	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
29.	CSL-526	Machine Learning	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
30.	CSL-527	Internet of Things	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
31.	CSL-3xx	Design and Verification of Graphics Processing Units	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
32.	CSL-530	Design and Analysis of Symmetric Cryptosystems	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
33.	CSL-531	Dynamic Graph Algorithms	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-
34.	CSL-532	Data Stream Mining	PEC/DHC	4	3	1	0	3	0	20-35	-	20-30	40-50	-

**List of Talent Enhancement Basket Courses**

Teaching Scheme					Contact Hours/Week			Exam Duration		Relative Weight (%)				
S. No.	Course Code	Course Title	Area	Cr.	L	T	P	Th.	Pr.	CWS	P R S	MTE	ETE	PRE
<b>TEB-A (Systems)</b>														
1	CST-101	Cyber Physical Systems	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-102	Linux Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-103	System Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
<b>TEB-B (Intelligent Computing)</b>														
1	CST-104	Applications of ML	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-105	Applications of DL	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-106	Applications of NLP	TEB	2	0	0	4	-	-	-	100	-	-	-
<b>TEB-C (Cyber Security)</b>														
1	CST-107	Cryptography	TEB	2	0	0	4	-	-	-	100	-	-	-
2	CST-108	Secure Socket Programming	TEB	2	0	0	4	-	-	-	100	-	-	-
3	CST-109	Cloud Security	TEB	2	0	0	4	-	-	-	100	-	-	-

### **Minor Specialization Courses**

<b>S.No.</b>	<b>Code</b>	<b>Course title</b>	<b>Semester</b>	<b>Credits</b>
1	CSC-102	Data Structures	Spring	4
2	CSC-201	Computer Organization & Architecture	Autumn	4
3	CSC-202	Theory of Computation	Spring	4
4	CSC-203	Design and Analysis of Algorithms	Autumn	4
5	CSC-204	Operating Systems	Spring	4
6	CSC-303	Computer Networks	Autumn	4
7	CSC-301	Database Management Systems	Autumn	4
8	CSC-206	Software Engineering	Spring	4