

**COMPUTER SCIENCE AND ENGINEERING**

The total minimum credits for completing the B.Tech. programme in Computer Science Engineering is **159**.

(I) GENERAL INSTITUTE REQUIREMENTS**1. MATHEMATICS**

Sl. No.	Course Code	Course Title	Credits
1.	MAIR12	Linear Algebra and Calculus	3
2.	MAIR22	Complex Analysis and Differential Equations	3
3.	MAIR31	Mathematics III - Probability and Random Processes	4
Total			10

2. PHYSICS

Sl. No.	Course Code	Course Title	Credits
1.	PHIR11	Physics	3
2.	PHIR12	Physics Lab	2
Total			5

3. CHEMISTRY

Sl. No.	Course Code	Course Title	Credits
1.	CHIR11	Chemistry	3
2.	CHIR12	Chemistry Lab	2
Total			5

4. HUMANITIES

Sl. No.	Course Code	Course Title	Credits
1.	HSIR13	Industrial Economics and Foreign Trade	3
Total			3

6. COMMUNICATION

Sl. No.	Course Code	Course Title	Credits
1.	HSIR11	English for Communication (Theory& Lab)	4
Total			4

**6. ENERGY AND ENVIRONMENTAL ENGINEERING**

Sl. No.	Course Code	Course Title	Credits
1.	ENIR11	Energy and Environmental Engineering	2
Total			2

7. PROFESSIONAL ETHICS

Sl. No.	Course Code	Course Title	Credits
1.	HSIR14	Professional Ethics	3
Total			3

8. ENGINEERING GRAPHICS

Sl. No.	Course Code	Course Title	Credits
1.	MEIR12	Engineering Graphics	3
Total			3

9. ENGINEERING PRACTICE

Sl. No.	Course Code	Course Title	Credits
1.	PRIR11	Engineering Practice	2
Total			2

10. BASIC ENGINEERING

Sl. No.	Course Code	Course Title	Credits
1.	CEIR11	Basics of Civil Engineering	2
2.	MEIR11	Basics of Mechanical Engineering	2
Total			4

11. INTRODUCTION TO COMPUTER PROGRAMMING

Sl. No.	Course Code	Course Title	Credits
1.	CSIR11	Introduction to Computer Programming (Theory & Lab)	3
Total			3

**12. BRANCH SPECIFIC COURSE**

Sl. No.	Course Code	Course Title	Credits
1.	CSIR21	Branch Specific Course - Essentials of Computer Science	2
Total			2

13. SUMMER INTERNSHIP

Sl. No.	Course Code	Course Title	Credits
1.	CSIR71	Internship / Industrial Training / Academic Attachment (2 to 3 months duration during summer)	2
Total			2

14. PROJECTWORK (OPTIONAL COURSE)

Sl. No.	Course Code	Course Title	Credits
1.	CSIR82	Project Work (Optional)	6
Total			6

15. COMPREHENSIVE VIVA

Sl. No.	Course Code	Course Title	Credits
1.	CSIR81	Comprehensive viva voce	1
Total			1

16. INDUSTRIAL LECTURE

Sl. No.	Course Code	Course Title	Credits
1.	CSIR61	Industrial Lecture	1
Total			1

17. NSS /NCC/ NSO

Sl. No.	Course Code	Course Title	Credits
1.	SWIR11	NSS/NCC/NSO	0
Total			0

(II) PROGRAMME CORE COURSES

Sl. No.	Course Code	Course Title	Pre requisites	Credits
1.	CSPC11	Programme Core – I / Discrete Structures	-	4
2.	CSPC31	Programme Core – II / Principles of Programming languages	-	4
3.	CSPC32	Programme Core – III / Data Structures	-	3
4.	CSPC33	Programme Core – IV / Digital systems design	-	3
5.	CSPC34	Programme Core – V / Computer Organization	-	3
6.	CSPC41	Programme Core – VI / Formal languages and automata theory	CSPC11	4
7.	CSPC42	Programme Core – VII / Design and analysis of algorithms	CSPC32	3
8.	CSPC43	Programme Core – VIII / Operating systems	-	3
9.	CSPC51	Programme Core – IX / Computer Architecture	CSPC34	4
10.	CSPC52	Programme Core – X / Database Management Systems	-	3
11.	CSPC53	Programme Core – XI / Computer Networks	-	3
12.	CSPC54	Programme Core – XII / Introduction to Artificial Intelligence and Machine Learning	CSPC11	4
13.	CSPC61	Programme Core – XIII / Embedded Systems Architectures	CSPC34	3
14.	CSPC62	Programme Core – XIV / Compiler Design	CSPC41	4
15.	CSPC63	Programme Core – XV / Principles of Cryptography	-	3
Total				51

(III) ELECTIVE COURSES**(a) PROGRAMME ELECTIVE COURSES (PE)**

Sl. No.	Course Code	Course Title	Pre requisites	Credits
1.	CSPE31	Linear Algebra and applications	-	3
2.	CSPE32	Combinatorics and Graph theory	CSPC11	3
3.	CSPE41	Software Engineering	-	3
4.	CSPE42	Design Thinking	-	3
5.	CSPE43	Advanced Data structures and algorithms	CSPC31	3



6.	CSPE44	Computer Graphics	-	3
7.	CSPE45	Multimedia Systems	-	3
8.	CSPE51	Augmented and Virtual Reality	-	3
9.	CSPE52	Digital Signal Processing	-	3
10.	CSPE53	Game Theory	-	3
11.	CSPE54	Real Time Systems	CSPC43	3
12.	CSPE55	Software Testing and Automation	-	3
13.	CSPE56	Cloud Computing	CSPC43	3
14.	CSPE57	Agile Software Development	-	3
15.	CSPE61	Web Technology and its Applications	CSPC42	3
16.	CSPE62	Advanced Database Management Systems	CSPC52	3
17.	CSPE63	Artificial Intelligence and its Applications	CSPC54	3
18.	CSPE64	Data Analytics	CSPC52	3
19.	CSPE65	Machine Learning Techniques and Practices	CSPC54	3
20.	CSPE66	Mobile Computing	CSPC53	3
21.	CSPE67	Internetworking Protocols	CSPC53	3
22.	CSPE68	Design and Analysis of Parallel Algorithms	CSPC42	3
23.	CSPE71	Advanced Cryptography	CSPC63	3
24.	CSPE72	Deep Learning Techniques	CSPC54	3
25.	CSPE73	Natural Language Processing	CSPC62	3
26.	CSPE74	Image Processing and Applications	-	3
27.	CSPE75	Network Security	CSPC63	3
28.	CSPE76	Wireless Network Systems	CSPC53	3
29.	CSPE77	Parallel Architectures and Programming	CSPC51	3
30.	CSPE78	Information Security	-	3
31.	CSPE79	Human Computer Interaction	-	3
32.	CSPE70	Undergraduate Research 1		3
33.	CSPE81	Data Science	-	3
34.	CSPE82	GPU Computing	CSPC51	3
35.	CSPE83	Internet of Things - Principles and Practices	-	3
36.	CSPE84	Social Network Analysis	-	3
37.	CSPE85	Speech Processing Techniques	-	3
38.	CSPE86	Undergraduate Research 2		3

**(b) OPEN ELECTIVE COURSES**

Sl. No.	Course Code	Course Title	Pre requisites	Credits
1.	CSOE11	Big Data Analytics	-	3
2.	CSOE12	Cloud & Grid Computing	-	3
3.	CSOE13	Computer Graphics and Multimedia Systems	-	3
4.	CSOE14	Distributed Architecture	-	3
5.	CSOE15	Human Computer Interaction	-	3
6.	CSOE16	Image Processing	-	3
7.	CSOE17	Internet of Things	-	3
8.	CSOE18	Machine learning for Engineering Applications	-	3
9.	CSOE19	Security Principles	-	3
10.	CSOE20	Soft Computing	-	3
11.	CSOE21	Software Project Management	-	3
12.	CSOE22	Software Testing & Practices	-	3
13.	CSOE23	Web Technology	-	3

(IV) ESSENTIAL PROGRAMME LABORATORY REQUIREMENTS (ELR)

Sl. No.	Course Code	Course Title	Pre-/Co-requisites	Credits
1.	CSLR31	Laboratory – I / Data structures laboratory	CSPC31	2
2.	CSLR32	Laboratory – II / Digital laboratory	CSPC32	2
3.	CSLR41	Laboratory – III / Algorithms laboratory	CSPC42	2
4.	CSLR42	Laboratory – IV / Operating systems lab	CSPC43	2
5.	CSLR51	Laboratory – V / Database Management Systems Laboratory	CSPC52	2
6.	CSLR52	Laboratory – VI / Networks laboratory	CSPC53	2
7.	CSLR61	Laboratory – VII / Embedded Systems Laboratory	CSPC61	2
8.	CSLR62	Laboratory – VIII / App Development laboratory	CSPC31	2
Total				16

**(V) MINOR COURSES (MI)**

Sl. No.	Course Code	Course Title	Pre requisites	Credits
1.	CSMI11	Data Structures and Algorithms	-	3
2.	CSMI12	Computer Organization	-	3
3.	CSMI13	Operating Systems	-	3
4.	CSMI14	Database Management Systems	-	3
5.	CSMI15	Software Engineering	-	3
6.	CSMI16	Computer Networks	-	3
7.	CSMI17	Artificial Intelligence	-	3

(VI) HONOURS

Sl. No.	Course Code	Course Title	Pre requisites	Credits
1.	CSHO11	Software Defined Networking	-	3
2.	CSHO12	Distributed Systems	CSPC41	4
3.	CSHO13	Multi-core Programming	CSPC51	4
4.	CSHO14	Pervasive and Ubiquitous Computing	CSPC43	3
5.	CSHO15	Middleware Technologies	-	3
6.	CSHO16	Randomized Algorithms	CSPC42	4
7.	CSHO17	Big Data Mining	-	4
8.	CSHO18	Modelling and Simulation	-	4
9.	CSHO19	Quantum Computing	-	4