Four-Year Undergraduate Programme

Bachelor of Technology

Computer Science & Engineering - Computer Science Engineering (CSE)

Faculty of Engineering & Technology

Parul University

Vadodara, Gujarat, India

Faculty of Engineering & Technology
Bachelor of Technology in Computer Science & Engineering

1. Vision of the Department

To be a distinct hub of education that prepares skilled professionals in the field of Computer Science and Engineering.

2. Mission of the Department

M1 Enhance academic performance by adopting industry-oriented curriculum focusing on the thrust area of computer education through integrated learning in collaboration with prominent industries.

M2 Preparing students to face challenges of the real world through internships and project-based learning.

M3 Foster a research culture that results in a sound knowledge base, high-quality publications, new products and IPR.

M4 Inculcate ethical consciousness in students so that they can achieve success in their professional endeavours and can become responsible citizens.

3. Program Educational Objectives

The statements below indicate the career and professional achievements that the B.Tech. Computer Science engineering curriculum enables graduates to attain.

PEO 1	To develop technical skills (critical investigation, communication, analytical and computer) and human relations skills (group dynamics, team building, organization and delegation) to enable students to transform the acquired knowledge into action.
PEO 2	To inculcate critical analysis and communication skills into students to effectively present their views, both in writing and through oral presentations.
PEO 3	To provide an environment for exploring the Research & Development attitude, to help the students in the Research and Development field.

4. Program Learning Outcomes

Program Learning outcomes are statements conveying the intent of a program of study.

PLO 1	**Engineering knowledge:**	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PLO 2	**Problem analysis:**	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PLO 3	**Design/development of solutions:**	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
PLO 4	**Conduct investigations of complex problems:**	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PLO 5	**Modern tool usage:**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PLO 6	**The engineer and society:**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PLO 7	**Environment and sustainability:**	Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.
PLO 8	**Ethics:**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PLO 9	**Individual and team work:**	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PLO 10	**Communication:**	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PLO 11	**Project management and finance:**	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PLO 12	**Life-long learning:**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

5. Program Specific Learning Outcomes

PSO 1	**Demand as per recent development**	An ability to analyse, design, verify, validate, code and maintain the solution of given problem to derive execution of software system
PSO 2	**Software skill**	An ability to understand, apply and work with one or more domain using knowledge of mathematical techniques and principles with relevant areas of computer science

6. Credit Framework

Semester wise Credit distribution of the programme	
Semester-1	16
Semester-2	20
Semester-3	22
Semester-4	23
Semester-5	21
Semester-6	24
Semester-7	27
Semester-8	14
Total Credits:	**167**

Category wise Credit distribution of the programme	
Category	**Credit**
Major Core	74
Minor Stream	0
Multidisciplinary	24
Ability Enhancement Course	9
Skill Enhancement Courses	9
Value added Courses	26
Summer Internship	16
Research Project/Dissertation	9
Total Credits:	**167**

7. Program Curriculum

Semester 1						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	303192102	Engineering Physics	4	3	2	0
2	303191101	Mathematics-I	4	4	0	0
3	303105103	Open-Source Software	2	1	2	0

4	303193103	Communication Skills	2	0	0	2
5	303105104	Computational Thinking for Structured Design 1	4	3	2	0
6	303104105	Environmental Science	AUDIT	1	0	0
		Total	**16**	**12**	**6**	**2**
Semester 2						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
7	303105151	Computational Thinking for Structured Design 2	4	3	2	0
8	303107152	ICT Workshop	1	0	2	0
9	303105152	Design Thinking	3	2	2	0
10	303191151	Mathematics-II	4	4	0	0
11	303193152	Advanced Communication & Technical Writing	2	0	0	2
12	303105153	Global Certifications- Fundamentals (AZ-900)	2	2	0	0
13	303106103	Electrical and Electronics Engineering	4	3	2	0
		Total	**20**	**14**	**8**	**2**
Semester 3						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
14	303105201	Design of Data Structures	3	3	0	0
15	303105202	Data Structure & Algorithms Laboratory	2	0	4	0
16	303105203	Database Management System	3	3	0	0
17	303105204	Database Management System Laboratory	1	0	2	0
18	303105205	Object Oriented Programming with JAVA	2	2	0	0
19	303105206	Object Oriented Programming with JAVA Laboratory	1	0	2	0
20	303105220	Digital Electronics	3	3	0	0
21	303105221	Digital Electronics Laboratory	1	0	2	0
22	303191202	Discrete Mathematics	4	4	0	0
23	303193203	Professional Communication Skills	2	0	0	2
		Total	**22**	**15**	**10**	**2**
Semester 4						

Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
24	303105251	Operating System	3	3	0	0
25	303105252	Operating System Laboratory	1	0	2	0
26	303105210	Computer Organization and Microprocessor	3	3	0	0
27	303105211	Computer Organization and Microprocessor Labs	1	0	2	0
28	303105255	Computer Network	3	3	0	0
29	303105256	Computer Network Laboratory	1	0	2	0
30	303105257	Programming in Python with Full Stack Development	3	3	0	0
31	303105258	Programming in Python with Full Stack Development Laboratory	1	0	2	0
32	303191258	Probability, Statistics and Numerical Methods	4	4	0	0
33	303193252	Professional Grooming and Personality Development	1	0	0	1
34	303105259	Competitive Coding	2	0	4	0
		Total	**23**	**16**	**12**	**1**

Semester 5

Sr. No.	Subject Code	Subject Name	Credit	Lect	Lab	Tut
35	303105218	Design and Analysis of Algorithms	3	3	0	0
36	303105219	Design and Analysis of Algorithms Laboratory	2	0	4	0
37	303105306	Theory of Computation	3	3	0	0
38	303105253	Software Engineering	3	3	0	0
39	303105254	Software Engineering Laboratory	1	0	2	0
40	303105309	Enterprise Programming	2	2	0	0
41	303105310	Enterprise Programming Laboratory	1	0	2	0
42	303193304	Professionalism & Corporate Ethics	1	1	0	0
43	303105311	Quant, and Reasoning	3	3	0	0
44		Open Elective 01 (Compulsory Subjects :1)	2	2	0	0
		Total	**21**	**17**	**8**	**0**

Open Elective 01						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	303101331	Basic Aircraft Science	2	1	2	0
2	T303105332	Disaster Preparedness and Planning	2	1	2	0
3	303105304	Cyber Security	2	1	2	0
4	303105305	Internet of Things	2	1	2	0
5	303107346	Fundamentals of Communication Engineering	2	1	2	0
Semester 6						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
45	T303105336	Project – 1	3	0	0	0
46	T303105337	Data Mining and Data Visualization	3	3	0	0
47	T303105338	Data Mining and Data Visualization Laboratory	1	0	2	0
48	303105349	Compiler Design	3	3	0	0
49	303105350	Compiler Design Laboratory	1	0	2	0
50	T303105341	MEA(R)N Stack Web Development	3	3	0	0
51	T303105342	MEA(R)N Stack Web Development Laboratory	1	0	2	0
52		PEC 01(Compulsory Subjects: 1)	3	3	0	0
53		PEC 01 – Labs-(Compulsory Subjects: 1)	1	0	2	0
54		PEC 02 (Compulsory Subjects: 2)	3	3	0	0
55		PEC 02 – Labs-(Compulsory Subjects: 2)	1	0	2	0
56	303193353	Employability Skills	1	0	0	1
		Total	**24**	**15**	**10**	**1**
PEC 01						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105344	Machine Learning	3	3	0	0
2	303105341	Cyber Security	3	3	0	0
3	303105363	Cloud Computing	3	3	0	0
PEC 01-LAB						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105345	Machine Learning Laboratory	1	0	2	0

2	303105342	Cyber security Laboratory	1	0	2	0
3	303105364	Cloud Computing Laboratory	1	0	2	0
PEC 02						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	303105379	Mobile Application Development	3	3	0	0
2	T303105352	.Net Programming	3	3	0	0
3	T303105354	DevOps	3	3	0	0
PEC 02-LAB						
1	303105380	Mobile Application Development Laboratory	1	0	2	0
2	T303105353	.Net Programming Laboratory	1	0	2	0
3	T303105355	DevOps Laboratory	1	0	2	0
Semester 7						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
57	T303105431	Summer Internship	2	0	0	0
58	T303105432	Information and Network Security	3	3	0	0
59	T303105432	Information and Network Security Laboratory	1	0	2	0
60	T303105433	Project – II	6	0	0	0
61	T303105434	Data Science	3	3	0	0
62	T303105435	Data Science Laboratory	1	0	2	0
63		PEC 03 (Compulsory Subjects: 1)	3	3	0	0
64		PEC 03 – Labs-(Compulsory Subjects: 1)	1	0	2	0
65		PEC 04 (Compulsory Subjects: 1)	3	3	0	0
66		PEC 04 – Labs-(Compulsory Subjects: 1)	1	0	2	0
67		Open Elective-2	3	3	0	0
		Total	**27**	**15**	**8**	**0**
Open Elective II						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105448	Remote Sensing and Geo Informatics	3	3	0	0
2	T303105449	Real Time Systems	3	3	0	0
3	T303105450	Cyber Physical Systems	3	3	0	0

4	T303105451	Computational Number Theory	3	3	0	0
5	T303105452	VLSI System Design	3	3	0	0
PEC 03						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105436	Internet of Things	3	3	0	0
2	T303105438	Deep Learning	3	3	0	0
3	T303105440	Modern Networks	3	3	0	0
PEC 03-LAB						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105437	Internet of Things Laboratory	1	0	2	0
2	T303105439	Deep Learning Laboratory	1	0	2	0
3	T303105441	Modern Networks Laboratory	1	0	2	0
PEC 04						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105442	Image Processing	3	3	0	0
2	T303105443	Blockchain Technologies	3	3	0	0
3	T303105444	Augmented Reality and Virtual Reality	3	3	0	0
PEC 04-LAB						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
1	T303105445	Image Processing Laboratory	1	0	2	0
2	T303105446	Block Chain Technologies Laboratory	1	0	2	0
3	T303105447	Augmented Reality and Virtual Reality Laboratory	1	0	2	0
Semester 8						
Sr. No.	**Subject Code**	**Subject Name**	**Credit**	**Lect**	**Lab**	**Tut**
68	T303105453	Internship	14	0	28	0
		Total	**14**	**0**	**28**	**0**
		Total Credits	**167**			