CRITERION 2	Program Curriculum and Teaching – Learning Processes	120

2. PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES (120)

2.1 Program Curriculum (20)

2.1.1. State the process used to identify extent of compliance of the University curriculum for attaining the PO & PSO. (10)

Sri Venkateshwaraa College of Engineering is affiliated to Pondicherry University, Puducherry. Hence Computer Science and Engineering prescribed by the Pondicherry University is being followed. Generally, our university curriculum maintains the balance in the composition of basic science, humanities, professional courses and their distribution in core and elective courses.

To a major extent our curriculum helps in attaining the POs and PSOs, however some components are not included in the curriculum provided by the Pondicherry University. In order to fill the curricular gaps our department makes additional efforts to impart such knowledge by co-curricular, extracurricular and other extension activities which are beyond the content of syllabus.

Following is the process used to identify the extent of compliance of University curriculum for attaining the POs and PSOs.

- Mapping each subject with all POs and PSOs
- Categorize entire curriculum into Core Courses, Science & Humanities, Programming, Inter Disciplinary and Projects / Lab Practices

2.1.1.1. Mapping of University Curriculum with POs & PSOs

PO1 - **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 - **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 - **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 the public health and safety, and the cultural, societal, and environmental considerations.

PO4 - **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.

PO5 - Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 - **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.

PO7 - **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 - **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 - **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 - **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

PO11 - 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.

PO12 - 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

Programme Specific Outcome (PSOs)

PSO1 - Capability to utilize fundamental mathematical principles in computer science and engineering to deliver optimal solutions.

PSO2 - Designing, testing, and evaluating software to meet end users' requirements and offering innovative technologies for creating cost-effective solutions.

Curriculum

I SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	**L**	**T**	**P**		
T101	Mathematics – I	3	1	-	4	4
T102	Physics	4	-	-	4	4
T103	Chemistry	4	-	-	4	4
T104	Basic Electrical and Electronics Engineering	3	1	-	4	4
T105	Engineering Thermodynamics	3	1	-	4	4
T106	Computer Programming	3	1	-	4	4
	Practical					
P101	Computer Programming Lab	-	-	3	3	2
P102	Engineering Graphics	2	-	3	5	2
P103	Basic Electrical & Electronics Lab	-	-	3	3	2
	Total	**22**	**4**	**9**	35	**30**

II SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	**L**	**T**	**P**		
T107	Mathematics – II	3	1	-	4	4
T108	Material Science	4	-	-	4	4
T109	Environmental Science	4	-	-	4	4
T110	Basic Civil and Mechanical Engineering	4	-	-	4	4
T111	Engineering Mechanics	3	1	-	4	4
T112	Communicative English	4	-	-	4	4
	Practical					
P104	Physics lab	-	-	3	3	2
P105	Chemistry lab	-	-	3	3	2
P106	Workshop Practice	-	-	3	3	2
P107	NSS / NCC *					
	Total	**22**	**2**	**9**	**33**	**30**

III SEMESTER

Code No.	Name of the Subjects	L	T	P	Total	Credits
	Theory					
MA T31	Mathematics –III	3	1	-	4	4
CS T32	Electronics Devices and Circuits	3	1	-	4	4
CS T33	Object Oriented Programming and Design	3	1	-	4	4
CS T34	Digital System Design	3	1	-	4	4
CS T35	Data Structures	3	1	-	4	4
CS T36	Computer Organization and Architecture	3	1	-	4	4
	Practical					
CS P31	Electronics Devices and Circuits Laboratory	-	-	3	3	2
CS P32	Data Structures Laboratory	-	-	3	3	2
CS P33	Digital System Design Laboratory	-	-	3	3	2
	Total	18	6	9	33	30

IV SEMESTER

Code No.	Name of the Subjects	L	T	P	Total	
	Theory					
MA T41	Mathematics –IV	3	1	-	4	4
CS T42	Microprocessors and Microcontrollers	3	1	-	4	4
CS T43	Automata Languages and Computations	3	1	-	4	4
CS T44	Design and Analysis of Algorithms	3	1	-	4	4
CS T45	Object Oriented Programming	3	1	-	4	4
CS T46	Graphics and Image Processing	3	1	-	4	4
	Practical					
CS P41	Microprocessors and Microcontrollers Laboratory	-	-	3	3	2
CS P42	Design and Analysis of Algorithms Laboratory	-	-	3	3	2
CS P43	Object Oriented Programming Lab	-	-	3	3	2
SP P44	Physical Education*	-	-	-	-	-
	Total	18	6	9	33	30

V SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	L	T	P		
CS T51	Operating Systems	3	1	-	4	4
CS T52	Computer Networks	3	1	-	4	4
CS T53	Database Management Systems	3	1	-	4	4
CS T54	Language Translators	3	1	-	4	4
CS T55	Software Engineering	3	1	-	4	4
	Practical					
CS P51	Operating Systems Laboratory	-	-	3	3	2
CS P52	Computer Networks Laboratory	-	-	3	3	2
CS P53	Database Management System Laboratory	-	-	3	3	2
HS P54	General Proficiency – I	-	-	3	3	1
	Total	**15**	**5**	**12**	**32**	**27**

VI SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	L	T	P		
CS T61	Enterprise Solutions	3	1	-	4	4
CS T62	Embedded Systems	3	1	-	4	4
CS T63	Web Technology	3	1	-	4	4
CS E61	Object Oriented Analysis and Design	3	1	-	4	4
CS E63	E-Business	3	1	-	4	4
	Practical					
CS P61	Enterprise Solutions Laboratory	-	-	3	3	2
CS P62	Embedded Systems Laboratory	-	-	3	3	2
CS P63	Web Technology Laboratory	-	-	3	3	2
CS P64	Industrial Visits/Training	-	-	-	-	1
HS P65	General Proficiency - II	-	-	3	3	1
	Total	**15**	**5**	**12**	**32**	**28**

VII SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	L	T	P		
CS T71	Artificial Intelligence	3	1	-	4	4
CS T72	Computer Hardware and Network Trouble Shooting	3	1	-	4	4
CS T73	Platform Technology	3	1	-	4	4
CS E77	Network Protocol	3	1	-	4	4
	Practical					
CS P71	Artificial Intelligence Laboratory	-	-	3	3	2
CS P72	Troubleshooting Laboratory	-	-	3	3	2
CS P73	Platform Technology Laboratory	-	-	3	3	2
CS PW7	Project Work – Phase I	-	-	6	6	6
	Total	**12**	**4**	**15**	**31**	**28**

VIII SEMESTER

Code No.	Name of the Subjects	Periods			Total	
	Theory	L	T	P		
CS T81	Professional Ethics	-	-	3	3	1
CS T82	Engineering Economics and Management	3	1	-	4	4
CS T83	Information Security	3	1	-	4	4
CS E84	Mobile Computing	3	1	-	4	4
CS E811	Cloud Computing	3	1	-	4	4
	Practical					
CS P81	Seminar	-	-	3	3	1
CS P82	Comprehensive Viva-Voce	-	-	3	3	1
CS PW8	Projects Work – Phase II	-	-	6	6	8
	Total	**12**	**4**	**15**	**31**	**27**

Sl No	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1.	T101	3	3	3	3	3	3	3	2	3	3	2	2	3	3
2.	T102	3	3	3	3	3	3	3	2	2	2	2	2	3	3
3.	T103	2	3	3	3	3	3	3	2	2	2	2	2	2	3
4.	T104	2	3	3	3	3	3	2	2	3	2	2	2	2	3
5.	T105	2	3	3	3	2	2	3	2	3	2	2	2	2	3
6.	T106	3	3	3	3	3	3	3	2	3	2	2	2	3	3
7.	P101	3	3	3	3	3	3	3	2	2	2	2	2	3	3
8.	P102	3	3	3	3	2	2	2	2	2	2	2	2	3	3
9.	P103	3	3	3	2	3	3	3	2	2	2	2	2	3	3
10.	T107	3	3	3	2	3	2	2	2	2	2	2	2	3	3
11.	T108	3	3	3	2	3	2	3	2	2	2	2	2	3	3
12.	T109	3	3	3	2	3	2	3	2	3	2	2	2	3	3
13.	T110	3	3	3	2	3	2	2	2	3	2	2	2	3	3
14.	T111	3	3	1	2	3	2	3	1	3	3	3	2	3	3
15.	T112	3	3	2	3	3	2	3	2	3	2	2	2	3	3
16.	P104	3	3	2	3	3	3	2	2	3	3	3	2	3	3
17.	P105	3	3	2	3	3	3	3	2	2	2	3	2	3	3
18.	P106	3	3	2	3	3	3	3	2	2	2	3	2	3	3
19.	P107	3	3	2	2	2	2	1	2	2	2	3	2	3	3
20.	MA T31	3	3	2	2	2	2	2	2	2	2	3	2	3	3
21.	CS T32	3	3	2	2	3	3	2	2	2	2	2	3	3	3
22.	CS T33	2	2	2	2	2	2	2	2	3	3	2	2	2	2
23.	CS T34	2	2	2	2	2	1	2	2	3	3	2	2	2	2
24.	CS T35	3	3	3	3	3	1	3	2	2	2	2	1	3	3
25.	CS T36	3	2	3	2	3	1	2	2	2	2	2	2	3	2
26.	CS P31	3	1	2	1	2	2	3	2	3	1	1	2	3	1
27.	CS P32	3	3	2	1	3	2	3	2	3	1	1	2	3	3
28.	CS P33	3	2	2	1	2	2	3	2	3	1	1	2	3	2

No.	Course														
29.	MA T41	3	3	2	2	2	2	3	2	2	2	2	2	3	3
30.	CS T42	2	3	2	2	2	2	3	1	1	2	2	1	2	3
31.	CS T43	2	3	3	2	2	1	3	1	2	2	1	3	2	3
32.	CS T44	2	3	3	3	3	2	3	1	2	2	1	2	2	3
33.	CS T45	2	3	3	3	3	3	2	2	3	3	3	3	2	3
34.	CS T46	2	3	3	1	1	2	2	1	2	1	1	2	2	3
35.	CS P41	3	1	2	1	2	2	3	2	3	1	1	2	3	1
36.	CS P42	3	3	3	2	3	2	3	1	2	2	2	2	3	3
37.	CS P43	3	3	3	1	3	2	3	1	2	1	1	2	3	3
38.	SP P44	3	2	2	2	2	3	2	1	3	2	1	2	3	2
39.	CS T51	3	3	2	2	2	3	3	2	2	2	2	1	3	3
40.	CS T52	3	3	3	3	3	3	3	2	2	2	2	3	3	3
41.	CS T53	3	3	3	3	3	3	2	2	3	3	3	3	3	3
42.	CS T54	3	3	2	2	2	2	3	1	1	3	2	1	3	3
43.	CS T55	3	2	3	2	2	1	2	2	2	2	2	2	3	2
44.	CS P51	3	3	2	2	1	3	3	2	2	2	2	1	3	3
45.	CS P52	2	3	3	2	1	3	3	1	2	2	2	2	2	3
46.	CS P53	3	3	2	1	3	2	3	2	2	1	2	2	3	3
47.	HS P54	2	2	2	3	3	2	3	2	3	3	1	3	2	2
48.	CS T61	2	2	3	3	3	1	2	2	2	2	2	2	2	2
49.	CS T62	2	2	3	3	3	1	2	2	2	2	2	2	2	2
50.	CS T63	3	3	2	3	3	2	3	1	1	2	2	1	3	3
51.	CS E61	2	3	2	3	3	2	3	1	1	2	2	1	2	3
52.	CS E63	2	2	3	3	3	1	2	2	2	2	2	2	2	2
53.	CS P61	3	2	2	3	3	3	1	1	2	2	1	3	3	2
54.	CS P62	3	1	2	3	3	3	3	2	3	1	1	2	3	1
55.	CS P63	3	1	2	3	3	3	3	2	3	1	1	2	3	1
56.	CS P64	2	2	2	3	3	2	2	2	1	3	1	3	2	2
57.	HS P65	3	2	2	3	3	3	1	1	2	3	1	2	3	2
58.	CS T71	2	3	2	3	3	3	3	2	3	1	1	2	2	3
59.	CS T72	3	3	3	3	3	3	3	2	3	1	1	2	3	3

No.	Course														
60.	CS T73	3	3	2	2	2	3	1	1	2	2	1	2	3	3
61.	CS E77	2	3	3	3	2	2	2	2	2	2	3	3	2	3
62.	CS P71	2	3	2	3	2	3	3	2	3	1	1	2	2	3
63.	CS P72	3	3	3	3	2	2	2	2	2	2	3	3	3	3
64.	CS P73	3	2	2	3	2	3	3	2	3	1	1	2	3	2
65.	CS PW7	3	3	3	3	3	3	3	3	3	3	3	3	3	3
66.	CS T81	3	2	2	2	2	3	3	3	2	2	1	2	3	2
67.	CS T82	2	2	2	2	3	2	2	3	3	3	2	3	2	2
68.	CS T83	3	3	3	3	3	3	2	2	3	2	2	3	3	3
69.	CS E84	3	3	3	3	3	3	2	2	3	2	2	3	3	3
70.	CS E811	3	3	3	3	3	3	2	2	2	2	2	3	3	3
71.	CS P81	3	3	3	3	3	3	3	3	3	3	3	3	3	3
72.	CS P82	3	3	3	3	3	3	2	2	2	3	3	3	3	3
73.	CS PW8	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Number of Courses Mapped		73	73	73	73	73	72	73	72	73	73	73	73	73	73
Percentage of Courses Mapped		100	100	100	100	100	99	100	99	100	100	100	100	100	100

The graph has been drawn between the number of courses mapped with concerned POs and PSOs as shown in Figure 2.1.1(a)
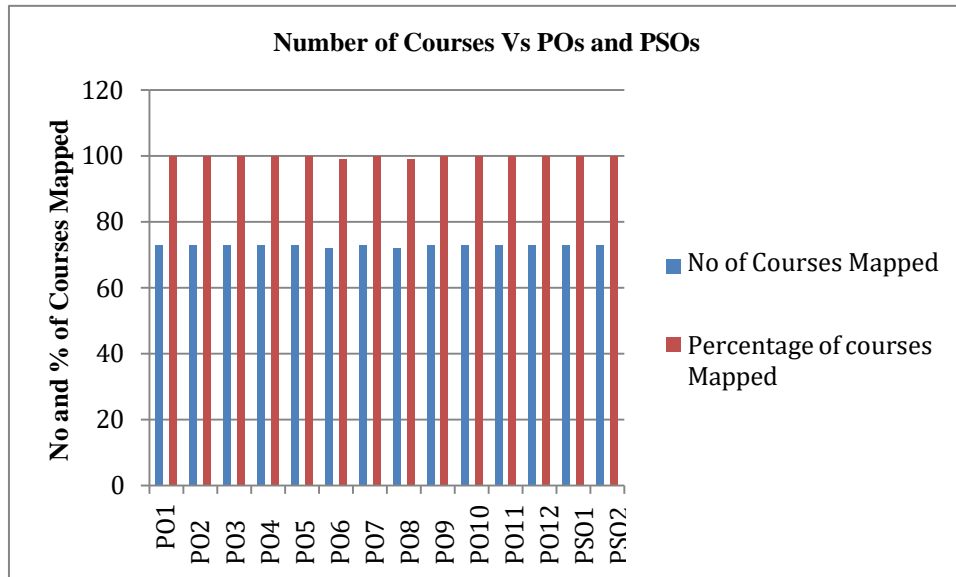
Fig. 2.1.1 (a) Number of Courses Vs POs and PSOs

➢ **University Curriculum**

The Process used to identify the extent of compliance of the University curriculum for attaining the Program Outcomes (POs) and Program Specific Outcomes (PSOs) is described below.

- The program curriculum is categorized into various streams like Basic sciences and Humanities, Basic engineering courses, Professional core courses, Management and Elective courses.
- Courses in each stream are identified.
- Course outcomes (COs) are defined for all the courses.
- COs are mapped with POs and PSOs.

➢ **Program Curriculum**

Basic Science and Humanities

The stream includes courses like Engineering Mathematics, Engineering Physics, Engineering Chemistry, Constitution of India & professional ethics and Environmental studies. These courses form the fundamental basis for all engineering disciplines which

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provides basic knowledge on mathematics, physics, chemistry, Indian constitution, professional ethics and importance of environment.

Basic Engineering Courses

The stream include courses like Basic electronics, Basic electrical engineering, Programming in C, Computer aided engineering drawing, Elements of mechanical engineering and Elements of civil engineering. These courses provide the fundamental knowledge on all engineering disciplines.

Professional Core Courses

The stream include courses relevant to the specific program and are meant to develop competencies required so that students acquire outcomes as desired by the profession. The course studies include core courses like Data Structures with C, Software Engineering, Formal Languages & Automata Theory, Operating Systems, Database Management Systems, Advanced Computer Architecture, Web Programming etc. Project work and technical seminar are included in final year to provide opportunity for students to develop understanding of the inter relationship between courses, develop and demonstrate higher order skills, and to apply the gained knowledge.

Management Courses

The stream includes courses like Management and Entrepreneurship. These are essential to create awareness on managerial & entrepreneurial skills.

Elective Courses

The stream includes courses like Operations Research, Java & J2EE, C# & .NET Framework, Information & Network Security, Clouds, Grids and Clusters, Software Testing, Web 2.0, Storage Area Networks etc.

Table 2.1.1 (a) Various streams of Program Curriculum

Sl.No	Streams	Curriculum Content (Number of Courses)	POs	PSOs
1.	Basic Science and Humanities	9	PO1, PO2,PO3,PO4, PO7	PSO1
2.	Basic Engineering Courses	6	PO1, PO2, PO3, P6,P7,P10	PSO1, PSO2
3.	Professional Core Courses	21	PO1, PO2, PO3, PO4, PO5, PO6, PO8,PO9,PO10, PO11, PO12	PSO1, PSO2, PSO3
4.	Interdisciplinary	4	PO1, PO2, PO3, PO5, PO12	PSO2
5.	Elective Courses	4	PO1, PO2, PO3, PO5, PO12	PSO1, PSO2
6.	Seminar, Industrial Visit, Project, Practicals, CVV	27	PO1, PO2, PO3, PO7, PO9, PO10 PO11, PO12	PSO1, PSO2, PSO3
7.	NSS/NCC, PE	2	PO1, PO2, PO3, PO5, PO12	PSO2
	Total	73		

➤ **Curricular Gaps**

The courses and the course content prescribed in the curriculum are mapped to the relevant POs and PSOs through individual course outcomes (COs). Curriculum gaps are identified through consolidation of average CO – PO/PSO mapping of all courses.

Knowledge on Contemporary technologies: Expert lectures, workshops, value added courses are conducted to enhance the knowledge of the students on niche areas.

2.1.1.2. Gap Identification Process

After mapping, an analysis is conducted to identify curricular gaps where the university syllabus does not fully address certain POs/PSOs. This is done through:

• **Faculty Feedback:** Teachers analyze course content and suggest areas where additional topics are required.

• **Student Feedback:** Students provide inputs on areas where they need more exposure or practical knowledge.

- **Alumni & Employer Feedback:** Industry professionals highlight missing industry-relevant skills and evolving technological trends.

Department of Computer Science and Engineering

Feedback Form- Faculty/Graduate/Academic Peer/Alumni

Name of the Person: V. KIRTHIVERSHA

Batch: 2020 - 2024

Faculty/Graduate/Academic Peer//Alumni/Parents:

Our college is in the process of NBA Accreditation. This survey helps to provide the information to attainment of Program Outcome, Program Specific Outcome, Programme educational Objectives, curricular gaps, vision, Mission of college and department.

Have you read the Vision, Mission and Programme Educational Objectives of IT department?
Yes ☑   No ☐

Whether it is aligned with the our college Vision and Mission?
Yes ☑   No ☐

Whether it is needed to updated the vision, Mission or Programme Educational Objectives?
Yes ☑   No ☐   if Yes, Vision ☐   Mission ☐   PEO ☐

Give Suggestion:

> should concentrate more on students skill development like programming and Placement

Any portion is obsolete?
Yes ☑   No ☐   if yes, please specify

> Exercise about the Generative AI and Data science

Any portion can be included?   Yes ☑   No ☐   if yes, please specify

> New Technologies like AIML and Devops can be included

Any other suggestions to meet industrial and social requirements,

> conduct programs regarding student skill development

Date: 8/4/2024

Signature, address with contact no/ mail
V. KIRTHIVERSHA,
9500558622

C. List the curricular gaps for the attainment of defined POs & PSOs
   Identified curricular gaps

   To ensure complete attainment of **POs and PSOs**, the department implements the following additional measures:

- **Add-on Courses & Certification Programs** (NPTEL, Coursera, etc.)
- **Workshops & Guest Lectures** by industry experts.
- **Hand-on Training** to provide practical, real-world experience that enhances learning and skill development.
- **Group seminar** is to facilitate discussion, knowledge sharing, and collaborative learning among participants.
- **Mini Projects & Hackathons** to enhance problem-solving skills.
- **Internships & Industry Visits** for better practical exposure.
- **Soft Skills & Leadership Training** sessions to improve professional competencies.

COURSE WITH CODE	GAP DESCRIPTION	POS AND PSOS TO BE COVERED	PROPOSED ACTION
CST35 - Data Structures	Create visualizations to help understand how data structures work.	PO6, PO8, PO9, PO10, PO11, PO12	Workshop
CS T33 - Object Oriented Programming and Design	Include python programming to meet industrial needs and developing projects	PO1, PO2, PO3, PO5, PO9, PO12, PSO1, PSO2	Value Added Course
CST43 – Automata Languages and Computations	To gain knowledge on automata transition using JFLAP online compiler tool.	PO1, PO2, PO5, PSO1, PSO2	Hand-on Training
CST44- Design and Analysis of Algorithms	Randomized algorithms use randomness to achieve better performance or solve problems that are difficult to solve deterministically	PSO1,PSO2,PO1, PO2,PO3	Guest Lecture
CS T51 - Operating Systems	Limited focus on the challenges of Multi-Core and Multi-Threading	PO1,PO2,PO3,PO5, PSO2	Guest Lecture
CS T52 - Computer Networks	To understand the working progress on TCP	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO9, PSO1, PSO2.	Video Lecture, Animated Video

CS T53 - Database Management Systems	Query optimization methods are listed but lack coverage of modern techniques like cost-based optimization in distributed systems.	PO1, PO2, PO3, PO4, PO5, PO7, PO8, PO10, PSO1, PSO2.	Guest Lecture
CS T61 - Enterprise Solutions	Limited to basic functionalities without exploring PeopleSoft's role in modern HR management systems.	PO1, PO2, PO3, PO5, PO6, PO7, PO11, PO12, PSO1, PSO2	Workshop
CS T63 - Web Technology	Focus on XML is comprehensive but lacks comparison with modern data interchange formats like JSON.	PO8, PO9, PO12, PSO1, PSO2	Value Added Course
CS T71 - Artificial Intelligence	Complexity and Multi-Agent Systems	PO1, PO2, PO3, PO5, PSO2	Guest Lecture
CS T81 – Professional Ethics	Team work, Communication, Lifelong learning	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PSO1, PSO2	Group seminar
CS T83 – Information Security	Focus on learning experience where individuals actively practice and apply cybersecurity concepts through simulated environments	PO2, PO3, PO4, PO5, PO10, PO11	Workshop
CS E811 - Cloud Computing	Practical knowledge on Cloud - Microsoft Azure	PO1, PO3, PO5, PO11, PSO1, PSO2	Workshop