

SHARDA SCHOOL OF ENGINEERING & TECHNOLOGY
Bachelor of Technology- Computer Science & Engineering
And
Specialization

Program Code: SET0101
Duration- 4 Years Full Time

PROGRAMME STRUCTURE
AND
CURRICULUM & SCHEME OF EXAMINATION
2024

Program and Course Structure

of

Bachelor of Technology- Computer Science & Engineering

B.Tech (CSE) with Specialization in Artificial Intelligence & Machine Learning

B.Tech (CSE) with Specialization in Artificial Intelligence of Things (AIoT)

B.Tech (CSE) with Specialization in Augmented and Virtual Reality

B.Tech (CSE) with Specialization in Block chain Technology

B.Tech (CSE) with Specialization in Cloud Technology and Virtualization in association with AWS

B.Tech (CSE) with Specialization in Data Science & Analytics

B.Tech (CSE) with Specialization in Cyber Security & Forensics in association with Microsoft

B.Tech (CSE) with Specialization in Full Stack Web Development in association with Xebia Academic Alliance

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. **Transformative educational experience**
2. **Enrichment by educational initiatives that encourage global outlook**
3. **Develop research, support disruptive innovations and accelerate entrepreneurship**
4. **Seeking beyond boundaries**

Core Values

- **Integrity**
- **Leadership**
- **Diversity**
- **Community**

Note: Detailed Mission Statements of University can be used for developing Mission Statements of Schools/ Departments.

Vision of the School

To become a globally acclaimed institution of higher learning in engineering and technology promoting excellence in research, innovation and entrepreneurship

Mission of the School

1. **To impart quality education with strong industry & academic connectivity in the expanding fields of Engineering and Technology in a conductive and enriching learning environment.**
2. **To product technocrats equipped with technical & soft skills and experiential learning required to stay current with the modern tools in emerging technologies to fulfill professional responsibilities and uphold ethical values.**
3. **To inculcate a culture of interdisciplinary research, innovation and entrepreneurship to provide sustainable solutions to meet the growing challenges and societal needs.**
4. **To foster collaborative learning and to play adaptive leadership role in professional career and pursuit of higher education through effective mentoring and counseling.**

Core Values

- **Industry & Academic Connectivity**
- **Experiential learning**
- **Interdisciplinary research**
- **Global**

1.2 Vision and Mission of the Department

Vision of the Department

To be recognized as the fountainhead of excellence in technical knowledge and research in computer science and engineering to attract students and scholars across the globe

Mission of the Department

1. **To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.**
2. **To promote interdisciplinary research & innovation-based activities in emerging areas of technology globally**
3. **To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.**
4. **To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration**

Core Values

- **Competency**
- **Global**
- **Entrepreneurship Skills**
- **Interdisciplinary research**

1.3 Programme Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

The Program Educational Objectives (PEOs) of UG Program in Computer Science & Engineering are:

PEO-1 The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering.

PEO-2 The graduates will provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities.

PEO-3 The graduates will become employable, successful entrepreneur as an outcome of Industry-Academia collaboration.

PEO-4 The graduates will embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities

Methods of Forming PEO's

STEP 1 : The needs of the Nation and society are identified through scientific publications, industry interaction and media.

STEP 2. Taking the above into consideration, the PEOs are established by the Coordination Committee of the department.

STEP 3. The PEOs are communicated to the alumni and their suggestions are obtained.

STEP 4. The PEOs are communicated to all the faculty members of the department and their feedback is obtained.

STEP 5. The PEOs are then put to the Board of Studies of the department for final approval.

[Note: Prepare a file for the same, how you arrive for PEO's]

1.3.2 Map PEOs with Mission Statements:

DEPARTMENT PEOs / DEPT OF CSE MISSION STATEMENTS	1. The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering.	2. The graduates will be able to provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities.	3. The graduates will become employable, successful entrepreneur and innovator as an outcome of Industry-Academia collaboration.	4. The graduates will be able to embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities.	
1. To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.	3	3	2	2	10/12
2. To promote interdisciplinary research & innovation based activities in emerging areas of technology globally.	2	3	2	2	9/12
3. To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.	2	2	3	3	10/12
4: To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration	2	2	2	3	9/12
	9/12	10/12	9/12	10/12	83%

Enter correlation levels 1, 2, or 3 as defined below:

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

If there is no correlation, put "-"

1.3.3 Program Outcomes (PO's)

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.
PSO1:		Experiment and prepare programming concepts and provide new ideas and innovations towards research and societal issues.
PSO2:		Analyse and develop computer programs in the areas related to algorithms, system software, cloud computing, artificial intelligence & machine learning, bioinformatics, big data analytics, block chain, cyber security and networking for efficient design of computer-based systems of varying complexity.
PSO3:		Apply standard Software Engineering practices and strategies in software project development using open-source programming environment to deliver a quality product for business success.

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

Mapping	PEO1	PEO2	PEO3	PEO4
PO1	3	3	2	1
PO2	3	3	3	1
PO3	2	2	3	3
PO4	2	2	3	2
PO5	2	3	2	2
PO6	1	2	2	3
PO7	1	1	2	3
PO8	1	1	2	3
PO9	1	2	3	1
PO10	1	1	3	2
PO11	3	2	3	1
PO12	2	3	1	1
PSO1	2	3	1	3
PSO2	3	3	2	2
PSO3	3	3	2	2

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

1.3.5 Program Outcome Vs Courses Mapping Table[1]:

Course Code	Course Name	Course Outcome Statement	PO1 Engineering knowledge	PO2 Problem analysis	PO3 Design/development of solutions	PO4 Conduct investigations of complex problems	PO5 Modern tool usage	PO6 The engineer and society	PO7 Environment and sustainability	PO8 Ethics	PO9 Individual and team work	PO10 Communication:	PO11 Project management and finance	PO12 Lifelong learning	PSO1 Familiarity and practical proficiency	PSO2 Understand, analyze and develop	PSO3 Apply standard Software
CSE113	Programming for Problem Solving	CO1	1	2	2						2				1	2	
		CO2	2		3	2	2				1		1		2	2	
		CO3	3		2	1					3					2	
		CO4	1		2	1					1					3	
		CO5	1		1											1	
		CO6	3	3	3	2					2		2		2	3	1
MTH142	Calculus and Abstract Algebra	CO1	3	3	2	2	3	1				1	1	1			
		CO2	3	3	3	2	2	2				1	1	2			
		CO3	3	3	2	2	2	1				1	1	1			
		CO4	3	3	2	2	2	1				1	1	1			
		CO5	3	3	2	2	2	1				1	1	2			
		CO6	3	3	2	3	2	2				1	1	2			
PHY125	Engineering Physics-I	CO1	3	3	2	2	2	1	1	1	2	1	1	1			
		CO2	3	3	2	3	3	2	1	1	1	1	1	1			
		CO3	3	3	2	3	3	2	1	1	1	1	1	1			
		CO4	3	3	3	2	3	2	1	1	1	1	1	1			

[1] Cel value will contain the correlation value of respective course with PO.

		CO5	3	3	3	2	3	2	1	1	1	1	1	1			
		CO6	3	3	3	3	3	2	1	1	1	1	1	1			
CVL103	Environmental Studies	CO1	2	2	3	3	3	3									
		CO2	2	2	2	2	2	3									
		CO3	2	2	3	2	3	3									
		CO4	2	2	3	2	3	3									
		CO5	2	2	2	2	3	3									
		CO6	2	2	3	2	2	3									
ARP101	Communicative English-1	CO1										3		3			
		CO2								2	2	2		3			
		CO3				2				2	2			3			
		CO4		2	2							2	2	3			
		CO5		3	2	2								2			
		CO6		2										3			
CSP113	Programming for Problem Solving Lab	CO1	2		3	2	2				2				3	2	2
		CO2	3		3	2	2				3				3	3	1
		CO3	2		3	1	2				2				2	3	2
		CO4	1		2	1	1				2				2	2	
		CO5	2		3	2	2				3				3	2	2
		CO6	3		3	3	1				2				2	3	2
CSP101	Introduction to Computer Science and Engineering	CO1	3	2										3	3		3
		CO2	3	2										3		3	2
		CO3	3	2										3		2	3
		CO4	3											3		3	2

		CO5	3					2		2				3		3	3
		CO6															
PHY162	Physics Lab	CO1	2	2	2	1	1	1	2	3	3	3	2	3	2		
		CO2	2	2	2	1	1	1	2	3	3	3	2	3	2		
		CO3	2	2	2	1	1	1	2	3	3	3	2	3	2		
		CO4	2	2	2	1	1	1	2	3	3	3	2	3	2		
		CO5	2	2	2	1	1	1	2	3	3	3	2	3	2		
		CO6	2	2	2	1	1	1	2	3	3	3	2	3	2		
Semester II																	
CSE114	Application based Programming in Python	CO1	2	1	1					2				2		1	
		CO2	2	2	2	1				2				2		2	1
		CO3	2	2	1					2				2	1	2	1
		CO4	2	2	2	2	1	2		2				2	1	2	2
		CO5	2	2	2	2	3	2		2				2	2	2	1
		CO6	3	3	2	2	2	2		2				2	2	3	2
MTH145	Probability and Statistics	CO1	3	3	2	2	3	1				1	1	1			
		CO2	3	2	3	2	2	2				1	1	2			
		CO3	3	3	2	2	2	1				1	1	1			
		CO4	3	2	2	2	2	1				1	1	1			
		CO5	3	3	2	2	2	1				1	1	2			
		C	3	3	2	3	2	2				1	1	2			

		CO6														
EEE112	Principles of Electrical and Electronics Engineering	CO1	3	3	2	2										
		CO2	1	1	2											
		CO3	2	2	1											
		CO4	2	1	2							1				
		CO5	3	2	1							1				
		CO6	2	2	3	1						1				
HMM111	Human Value & Ethics	CO1	1	1	1	1	2	1	2			2	3	1	1	3	
		CO2	1	3	2	2	1	3	1	1	2		3	3	2	2	1
		CO3		2	2	2		2	2		1		1		1	3	2
		CO4	1		1	2	3				2	3		2			1
		CO5		3		1	2	3	2	1		2	2	1	3	1	
		CO6	2		1			1			1	1				2	3
ARP102	Communicative English -2	CO1										3		3			
		CO2										3		3			
		CO3										3		3			
		CO4										3		3			
		CO5								3		3		3			
		CO6								3		3		3			
CSP116	Design and creativity Lab	CO1	3	3		3					3	3	2	3	2	2	1
		CO2	3	2		3			2		3	3	2	3			1
		CO3	3	2			2				3	3	2	3	2	2	
		CO4	3	3				2			3	3	2	3		2	
		CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
		C	3	3		3					3	3	2	3			1

		CO6														
CSP114	Application based Programming in Python	CO1	1	1	1	1				2				2		1	
		CO2	2	2	1	1	2			2				2		1	1
		CO3	2	2	1	1	1	1		2				2	1	2	1
		CO4	2	2	2	2	1	1		2				2	2	2	1
		CO5	2	2	2	2	2	2		2				2	2	2	2
		CO6	3	3	2	2	2	3		2				2	2	2	2
EEP112	Principles of Electrical and Electronics Engineering	CO1	3	3	2	2											
		CO2	1	1	2												
		CO3	2	2	1												
		CO4	2	1	2								1				
		CO5	3	2	1								1				
		CO6	2	2	3	1							1				
CSE242	Data Structures	CO1	2		2						2				2	2	
		CO2	1	2	3						1				3	1	2
		CO3	2	3	3	2					2				2	3	
		CO4			2						3			1	2	2	
		CO5	3	2	3	2	1				2				3	2	2
		CO6	2		3	3	2				1				2	3	3
CSP242	Data Structures Lab	CO1	2	2	3						3			2	3	2	2
		CO2	3	2	2	2	2				2				2	3	3
		CO3	3	1	3	3					3			1	3	2	2
		CO4	3	2	3	2					2			2	2	3	2
		CO5	2	2	2										1	2	2
		C	3	3	2	3					3				2	3	2

		O6														
Semester III																
CSE252	Computer Networks	CO1		2									2	3		3	
		CO2	2		2	2	3						2	3		3	
		CO3	3	2		2		2							2		2
		CO4		2	2											2	2
		CO5	2	2	2	2										2	
		CO6	2			2				2			2			2	
CSE245	Discrete Structures	CO1	2	3	3	1		3			3			3	3	3	
		CO2	2	2	3			2						3	3	2	
		CO3	3	2	3	3	3				2					3	2
		CO4	2	2	3	3	3						3	3	3		3
		CO5	2	2	2	3		3			3		3	3		2	3
		CO6	1	2	1	2	3				3		3		3	3	2
CSE247	Computer Organization and Architecture	CO1	3	1	1			2						2		1	3
		CO2	3	3	3			3						3		2	3
		CO3	3	2	3			2						3		2	3
		CO4	3	2	2			1						3		3	2
		CO5	3	3	3			2						3		2	2
		CO6	3	3	3			2						3		1	2

CSE253	Object Oriented Programming Using Java	CO1					2							2			
		CO2					2										
		CO3	2	3	3		2				3			2	2	3	
		CO4					2										
		CO5					2										
		CO6	3	3	3		2	3	2		3		2	3	3	3	2
CSE254	Principles of Operating System	CO1	3	3	3	3				2	2	1	2	1	3	2	2
		CO2	3	2	3	3				2	2	2	1	1	2	3	2
		CO3	3	3	3	3				1	1	1	3	2	3	2	1
		CO4	2	2	2	2	1			2	3	3	3	1	2	2	2
		CO5	2	2	3					3	3	1	2		3		
		CO6	3	2								2	3		2	2	
IED001	Introduction of Entrepreneurship	CO1	-	-	-	-	1	-	-	-	2	-	2	3	-	-	-
		CO2	1	1	2	3	3	3	-	-	-	-	-	-	-	-	-
		CO3	-	-	-	-	-	-	-	-	-	3	2	3	-	-	-
		CO4	-	-	-	-	-	-	-	-	-	1	3	1	-	-	-
		CO5	-	-	-	1	-	-	3	-	-	-	-	2	-	-	-
		CO6	-	1	3	2	1	-	-	-	-	-	1	2	-	-	-
ARP207	Logical Skills Building and Soft Skills	CO1		2	3												
		CO2						2		2	3						
		CO3								2	2						
		CO4									2			3			
		CO5										2					
		CO6		2													

CSP252	Computer Networks Lab	CO1		2									2	3		3	
		CO2	2		2	2	3						2	3		3	
		CO3	3	2		2		2							2		2
		CO4		2	2											2	2
		CO5	2	2	2	2										2	
		CO6	2			2				2			2			2	
CSP243	Object Oriented Programming Using Java	CO1					2							2			
		CO2					2										
		CO3	2	3	3		2				3			2	2	3	
		CO4					2										
		CO5					2										
		CO6	3	3	3		2	3	2		3		2	3	3	3	2
CSP244	Principles of Operating System Lab	CO1	3	3	3	3				2	2	1	2	1	3	2	2
		CO2	3	2	3	3				2	2	2	1	1	2	3	2
		CO3	3	3	3	3				1	1	1	3	2	3	2	1
		CO4	2	2	2	2	1			2	3	3	3	1	2	2	2
		CO5	2	2	3					3	3	1	2		3		
		CO6	3	2								2	3		2	2	
CSP254	Project Based Learning (PBL) -1	CO1	3	3		3					3	3	2	3	2	2	1
		CO2	3	2		3			2		3	3	2	3			1
		CO3	3	2			2				3	3	2	3	2	2	
		CO4	3	3				2			3	3	2	3		2	
		CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
		CO6	3	3		3					3	3	2	3			1

CSP292	Summer Internship -I	CO1	2													
		CO2		3	2		2								2	2	
		CO3	2	2	3						3				1		
		CO4										3					
		CO5						2		3							
		CO6												2	1		
Semester IV																	
BTY223	Introduction to Biology for Engineers	CO1	3	1				1	3					3			
		CO2	3	2				2						3			
		CO3	3	3	3	1	1	3	3	2	1	3		3	1	1	
		CO4	3	2				2	2	3	1	2		3	1		
		CO5	3	1	1	1	3	1	3	2	1	2	1	3	1	1	
		CO6	3	3	1	1	2	3	5	1	1	1		3	1		
CSE249	Data Base Management System	CO1	3					2						3	3	3	
		CO2	2				3	2			2			3	3	3	
		CO3	3	3	3		3	2						2	2	3	
		CO4	3	3	3	3		2		2	3			2			3
		CO5	2	3	2		2	2		2				1		3	
		CO6	3	3	3	3	3	3		3	3	3	2	3			3
CSE25	Theory of	C	3	3	3	3	2				3			3	3	2	

1	Computation	O1														
		CO2	3		3	3	2				2			2		3	2
		CO3	3	3	3	3					2				3	2	
		CO4	2	2	2		2				3			2			3
		CO5	3	3	3	3	3							3	3	2	2
		CO6	3	2	3	3	3				2			3	3	3	2
HMM305	Management for Engineers	CO1	2	1	2	2	2	2		2	1	3			1	1	2
		CO2	1	1	2	2	1	2	1			2	2	1	1	1	2
		CO3	3	1	1	2	3	2		2			1	2	1	2	2
		CO4		2	2	1		1		1		2	1		1	1	2
		CO5		1	2	2		2	3	1	2			1	2	2	1
		CO6	1	2	1	1	2	2	2		1			1	2	2	2
CSE011	Mathematical Techniques	CO1	3	2											2		
		CO2	2	3	1	1	1		1			1	2	1	1	1	
		CO3	3	1	1	1			1			2	1	1	3	1	
		CO4	2	3	2	1	1		1			1	1	1	2	1	
		CO5	1	1	1	2	2		1			1	2	1	2	1	
		CO6	3	1	3	1	2		2			2	2	3	3	1	
CSE012	Introduction to Graph Theory and its Applications	CO1	3	3	2	2	1	2	2			2	1	2	3	1	
		CO2	3	3	3	2		1	1			1		2	3	1	
		CO3	1	3	1	3	2	2				1		2	2	2	
		CO4	1	3	1	3	1	1				2		1	3	2	
		CO5	2	2	2	3	2	1				1		2	1	2	
		CO6	1	1	2	3	1	2				2		2	1	2	2
OE1	Open	C															

	Elective – 1	CO1														
		CO2														
		CO3														
		CO4														
		CO5														
		CO6														
ARP208	Quantitative and Qualitative Aptitude Skill Building	CO1								2		3		3			
		CO2										2					
		CO3									2	2					
		CO4										2					
		CO5										2					
		CO6		2	2						2						
CSP249	Data Base Management System Lab	CO1	3				2								2	3	2
		CO2		3	3	3	2				3				2	3	3
		CO3		2	2	2	2				3				2	2	3
		CO4		2	2	2	2				3				2	2	3
		CO5		2	2	2	2				3				2	2	3
		CO6		2	3	2	3				3			2	3	3	3
CSP297	Project Based Learning (PBL) -2	CO1	3	3		3					3	3	2	3	2	2	1
		CO2	3	2		3			2		3	3	2	3			1
		CO3	3	2			2				3	3	2	3	2	2	
		CO4	3	3				2			3	3	2	3		2	
		CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
		CO6	3	3		3					3	3	2	3			1
Semester V																	

CSE356	Design and Analysis of Algorithm	CO1	2	3	1	2					2				3	2	2
		CO2	2	2	2	2					3				2	3	2
		CO3	2	1	2						1				3	2	
		CO4	1	2	2	3					2				2	2	2
		CO5	3	3	1	3					3				2	1	3
		CO6	2	2	3	2	2				2				3	2	
CSE357	Software Engineering and Testing Methodologies	CO1	1	3	2	-	-	-	2	2	3	-	-				
		CO2	3	2	2	1	1	-	3	3	3	-	-				
		CO3	2	2	2	1	1	2	2	3	3	-	-				
		CO4	3	3	2	1	2	2	2	2	3	-	-				
		CO5	3	3	2	1	2	2	2	2	3	-	-				
		CO6	3	3	2	2	3	2	2	3	3	-	-				
BRM003	Research Methodology	CO1	**3**	**2**	2	2	-	-	-	-	**2**	**2**	2	3			
		CO2	**2**	3	3	3	-	2	-	-	-	-	3	3			
		CO3	2	2	-	**2**	**2**	-	**2**	**2**	-	**2**	2	2			
		CO4	3	3	3	**3**	-	3	-	-	3	-	3	3			
		CO5	**2**	-	3	**2**	3	-	3	**3**	**2**	3	3	2			
		CO6	3	-	-	3	**2**	2	**2**	**2**	2	2	**2**	3			
CSE021	Introduction to Cloud	CO1	2	3	1	2											
		C	2	2	2	3											

	Computing	CO2														
		CO3	1	3	1	2									2	3
		CO4	3	1	2	2									3	2
		CO5	2	2	3	1									2	2
		CO6	1	3	1	2								2	3	3
CSE023	Android Application Development	CO1					3				2			1			2
		CO2					3				2			1			2
		CO3			2		3				2			1	2		2
		CO4					3				2		2	1			2
		CO5			2	3	3		2		2		2	1			2
		CO6	1	2	3	3	3	3	3		3		3	1	3	3	3
CSE024	Web Technologies	CO1					1									1	
		CO2					3							1		1	
		CO3		1	3		2	1			2				1	2	2
		CO4		1	3		1	1			2				1	2	2
		CO5					2									1	
		CO6	2	3	3	1	3	3	1		3		2	2	1	2	3
OE-2	Open Elective – 2	CO1															
		CO2															
		CO3															
		CO4															
		CO5															
		CO6															
ARP305	Personality Develop	CO1						2			2			3			
		C						2			2			3			

	ment and Decision making Skills	O2															
		CO3									2	2		3			
		CO4						2	2		2			3			
		CO5						2	2		2			3			
		CO6		2	2												
CSP350	Design and Analysis of Algorithm Lab	CO1	3	3	2	3	1				2				2	3	3
		CO2	2	3	3	2	2				2				3	2	2
		CO3	3	2	2		3				1				2	1	
		CO4	2	3	3	3	1				3				3	3	1
		CO5	3	2	2	3	2				2				2	3	2
		CO6	2	3	3	1	3				1				3	2	3
CSP391	Project Based Learning (PBL) -3	CO1	3	3		2		1		1	2		2	1	2	2	3
		CO2	3	2	2	2	2			1	2		2	1	2	1	1
		CO3	3	2	2	2	2	3		1	2		2	1	2	2	
		CO4	3	3	2	2	3			1	2			1	2	2	2
		CO5	3	2			3			1	2			1	2	2	
		CO6		1		1				2	2	3	3	3	1		1
CSP355	Software Engineering and Testing Methodologies	CO1	3	-	2	-	-	-	-	1	2	3	-	3	1	-	2
		CO2	3	3	2	3	3	-	-	1	2	3	2	3	2	-	3
		CO3	3	2	3	3	3	-	-	1	2	3	1	2	2	-	3
		CO4	3	1	-	1	3	2	2	3	3	2	3	2	-	-	3
		CO5	3	1	3	3	3	3	2	3	3	1	3	1	3	-	3
		CO6	2	-	-	1	3	-	1	2	2	2	2	2	3	-	3
CSP022	Android Application	CO1					3				2			1			2
		C					3				2			1			2

	Development Lab	O2														
		CO3			2		3				2			1	2		2
		CO4					3				2		2	1			2
		CO5			2	3	3		2		2		2	1			2
		CO6	1	2	3	3	3	3	3		3		3	1	3	3	3
CSP024	Web Technologies Lab	CO1					1				2					1	
		CO2		1	1		3				2			1		1	2
		CO3			1		2	1			2					1	2
		CO4					1	1									
		CO5		1			2				2			1		1	2
		CO6	2	3	3	1	3	3			3		2	2	1	2	3
CSP398	Summer Internship-II	CO1	2	2		3	2		1	1	1				1	2	2
		CO2	1	2	1	2	2		1	1	1				1	2	
		CO3	2		2	2	2			1	3		1	1	1	2	2
		CO4								1		3					
		CO5						2		3							
		CO6												2	2	2	
CSP395	Technical Skill Enhancement Course-1 Simulation Lab	CO1	1		1		2							1	1	2	1
		CO2	1		1		2					2		1	1	2	1
		CO3	1	2	1		2							1	1	2	1
		CO4	1		1		2							1	1	2	1
		CO5	1		1		2							1	1	2	1
		CO6	2	2	3	3	2	2	1		2	3	2	2	2	3	1
ECC301	Community Connect	CO1										2	3	3	3	2	1
		C					1		1		2	3	3	3	3		

		CO2															
		CO3	2		2		2		2	2					1		
		CO4			1			3							3		
		CO5									2				1		
		CO6									3	3	3				
Semester VI																	
CSE353	Compiler Design	CO1	3				3				2			3	2	1	
		CO2	2	2	3	3	2							2	3	2	
		CO3	3	3	3										3	2	
		CO4	1	2	3	3	3				3					3	2
		CO5	1	1	2	3	2				3			3	1	2	2
		CO6	2		3	3	2				3			3	3	2	3
CSE472	Artificial Intelligence	CO1	1	2	3	2	2					2		2	3	2	2
		CO2	2	3	3	2	3					2		2	3	3	2
		CO3	3	3	3	3	2	1	1			1	2	3	3	2	3
		CO4	3	3	3	3	2	2	1			2	1	3	3	2	3
		CO5	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
		CO6	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
CSE031	Digital Image Processing	CO1	3	3	3	3	1	1	1	1	1	2	1	3	2	3	1
		CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2

		CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
		CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO6	3	3	3	3	2	3	3	1	3	2	1	3	3	3	3
CSE032	Cryptography and Network Security	CO1	3	2											3	1	
		CO2	2	3	2	1									3	2	
		CO3	2		2		3								2	2	1
		CO4	2			2		2	2						2	2	
		CO5					2			2	2	2			1		
		CO6										2	2	2	2		2
CSE041	Software Project Management	CO1	3		1		1				3	2	3	2			2
		CO2	2		2		2				3	3	3	3			2
		CO3	2		3		2			1	3	2	3	3			3
		CO4	2		2		2			1	3	2	3	3			3
		CO5	1		3		2	3		1	3	3	3	3			3
		CO6	2		3	3	2	2		1	3	3	3	2			2
CSE042	Software Testing	CO1	2	1								3		2			3
		CO2	3	3	3	2	3	1		1	2	3		2	2		3
		CO3	3	3	3	2	2	2		1	2	3		2	2		3
		CO4	3	3	3	2	3	1		1	2	3		2	2		3
		CO5	3	3	2	2	2	2		1	2	3		2	2		3
		CO6	3	3	3	2	3	2	3	2	3	3	3	3	2		3
CSE051	Wireless Networks	CO1	3		3					1							2
		CO2	3	2	3					1							2

		CO3	3	2	3					1							2
		CO4	3	2	3					1							2
		CO5	3	2	3	2	2			1							3
		CO6	3	2	3	2	2			1							3
CSE052	Risk Management	CO1	3						1					1	2		
		CO2	2	2		3	2			1	2	1	1	1			2
		CO3	2								2			1	1		
		CO4	1		2		3				2	2	2				1
		CO5	2	2		2	1		1		2	1	1				1
		CO6	2	2	2				1		2	1	1	1		1	
CSE053	Advanced Operating System	CO1	3	3	3	3				2	2	1	2	1	3	2	2
		CO2	3	2	3	3				2	2	2	1	1	2	3	2
		CO3	3	3	3	3				1	1	1	3	2	3	2	1
		CO4	2	2	2	2	1			2	3	3	3	1	2	2	2
		CO5	2	2	3					3	3	1	2		3		
		CO6	3	2								2	3		2	2	
OE-3	Open Elective – 3	CO1															
		CO2															
		CO3															
		CO4															
		CO5															
		CO6															
ARP306	Campus to Corporate	CO1						2	2		2	3		3			
		CO2						2	2		2	3		3			

		CO3						2	2		2	3		3			
		CO4						2	2		2	3		3			
		CO5						2	2		2	3		3			
		CO6		2	2												
CSP353	Compiler Design Lab	CO1	3				3				2			3	2	1	
		CO2	2	2	3	3	2							2	3	2	
		CO3	3	3	3										3	2	
		CO4	1	2	3	3	3				3					3	2
		CO5	1	1	2	3	2				3			3	1	2	2
		CO6	2		3	3	2				3			3	3	2	3
CSP396	Technical Skill Enhancement Course-2(Application Development Lab)	CO1	1		1		2							1	1	2	1
		CO2	1		1		2					2		1	1	2	1
		CO3	1	2	1		2							1	1	2	1
		CO4	1		2		2							1	1	2	1
		CO5	2		1		2							1	1	2	1
		CO6	2	2	3	2	2	2	1		2	3	2	2	2	3	1
CSP390	Project Based Learning (PBL) -4	CO1	3	3		2		1		1	2		2	1	2	2	3
		CO2	3	2	2	2	2			1	2		2	1	2	1	1
		CO3	3	2	2	2	2	3		1	2		2	1	2	2	
		CO4	3	3	2	2	3			1	2			1	2	2	2
		CO5	3	2			3			1	2			1	2	2	
		CO6		1		1				2	2	3	3	3	1		1
CSP472	Artificial Intelligence Lab	CO1	1	2	3	2	2					2		2	3	2	2
		CO2	2	3	3	2	3					2		2	3	3	2

		CO3	3	3	3	3	2	1	1			1	2	3	3	2	3
		CO4	3	3	3	3	2	2	1			2	1	3	3	2	3
		CO5	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
		CO6	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
Semester VII																	
CSE062	Mobile Computing	CO1	3	3		2	3					2			3	2	
		CO2	3	3		2	3					2			3	2	
		CO3	3	3		2	3					2			2	3	
		CO4	3	3		2	3					2			3	2	
		CO5	3	3		2	3					2			2	2	
		CO6	3	3		2	3					2			2	2	
CSE063	Quantum Computing	CO1	3	3			2			3				3			3
		CO2	3	3	2												3
		CO3	3	3	2		2				2			2	3		
		CO4	3	3		3	2	3		2						3	
		CO5	3	2	3					3	3					3	
		CO6	3	3		3	3	3	3			3	3		3		
CSE071	Introduction to Internet of Things	CO1	3	1	1			2	1					3	3		
		CO2	2	2	1			1	3					3	3		
		C	3	1	1	2		2	1					3	3		

		CO3														
		CO4	3	3	3	3	2	2		3	3	3	3	3	2	2	3
		CO5	3	3	3	3	3	2	3					3	3		
		CO6	2	2	2	2	3	2	3					3	3		
CSE072	Parallel Computing Algorithms	CO1	3	3			2			3				3			3
		CO2	3	3	2												3
		CO3	3	3	2		2				2			2	3		
		CO4	3	3		3	2	3		2						3	
		CO5	3	2	3					3	3					3	
		CO6	3	3		3	3	3	3			3	3		3		
CSE073	3D Printing and Software Tools	CO1	3	3			2			3				3			3
		CO2	3	3	2												3
		CO3	3	3	2		2				2			2	3		
		CO4	3	3		3	2	3		2						3	
		CO5	3	2	3					3	3					3	
		CO6	3	3		3	3	3	3			3	3		3		
OE4	Open Elective – 4	CO1															
		CO2															
		CO3															
		CO4															
		CO5															
		CO6															
CSP496	Summer Internship -III	CO1	2	2		3	2		1	1	1				1	2	2
		CO2	1	2	1	2	2		1	1	1				1	2	
		C	2		2	2	2			1	3		1	1	1	2	2

		CO3														
		CO4								1		3				
		CO5						2		3						
		CO6												2	2	2	
CSP497	Capstone – 1	CO1	3	3	3	2	2	2	2	1	2	1	1	2	2	3	3
		CO2	3	3	3	3	2	1	1	1	2	1	1	2	3	3	3
		CO3	3	1	3	3	2	1	1	1	2	1	1	2	3	3	3
		CO4	1	1	2	1	2	3	3	1	2	3	1	2	1	2	3
		CO5	1	2	2	1	2	1	1	1	2	2	1	2	1	2	3
		CO6	2	1	2	1	3			1	2	3	1	2	3	3	3
Semester VIII																	
CSP498	Capstone - 2	CO1	2	1	2	2	3	2	2	2	2	2	2	2	3	3	3
		CO2	2	2	3	2	3	2	2	2	2	2	2	2	11	3	3
		CO3	3	3	3	3	3	2	2	2	2	2	2	1	1	3	3
		CO4	2	2	2	2	3	2	2	2	2	3	2	1	1	2	2
		CO5	1	2	2	1	3	2	2	2	2	3	2	1	1	2	2
		CO6	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
B.Tech-Computer Science & Engineering with specialization in Artificial Intelligence & Machine Learning																	

CSA103	Introduction To AI & ML	CO1	3	3	3	1	2	1	1	1	2	3	1	3	2	3	1
		CO2	3	3	3	1	2	3	3	1	2	3	1	3	2	3	2
		CO3	3	3	3	1	2	3	3	1	3	3	3	3	3	3	3
		CO4	3	3	3	1	2	3	3	1	3	3	3	3	3	3	3
		CO5	3	3	3	1	2	3	3	1	3	3	3	3	3	3	3
		CO6	3	3	3	1	2	3	3	3	3	3	3	3	3	3	3
CSA202	Concept of Machine Learning	CO1	3	3	3	3	3	3	2	1	1	3	1	3	2	2	1
		CO2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CAL201	Concept of Machine Learning Lab	CO1	3	3	3	3	3	3	2	1	1	3	1	3	2	2	1
		CO2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CSA203	Concepts of Neural Networks	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO3	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CSA301	Soft Computin	CO1	3	3	1	1	1	1	1	1	2	1	1	3	1	3	1
		C	3	3	3	3	2	3	2	2	2	2	3	3	3	3	3

	g	O2															
		CO3	3	3	3	3	3	3	1	2	2	2	3	3	3	3	3
		CO4	3	3	3	3	3	3	3	2	2	2	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	2	3	2	3	3	3	3	3
		CO6	3	3	3	3	3	1	3	2	3	2	3	3	3	3	3
CSA302	Pattern Recognition	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	2	3	1	1	3	3	1	3	3	3	3
		CO3	3	3	3	3	2	2	2	1	2	3	1	3	3	3	3
		CO4	3	3	3	3	2	2	2	1	2	3	1	3	3	3	3
		CO5	3	3	3	3	2	3	1	1	2	3	1	3	3	3	3
		CO6	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3
CAL302	Pattern Recognition Lab	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	2	3	1	1	3	3	1	3	3	3	3
		CO3	3	3	3	3	2	2	2	1	2	3	1	3	3	3	3
		CO4	3	3	3	3	2	2	2	1	2	3	1	3	3	3	3
		CO5	3	3	3	3	2	3	1	1	2	3	1	3	3	3	3
		CO6	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3
CSA303	Deep Learning and Its Applications	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO3	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CAL303	Deep Learning and Its Applications Lab	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO3	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3

CSA402	Applications of AIML in healthcare / ICT/ Computer Networks	CO1	3	3	3	3	3	1	2	3	1	3	1	3	3	3	1
		CO2	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
		CO3	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
		CO6	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3
CSA401	Computer Vision	CO1	3	3	3	3	1	1	1	1	1	2	1	3	2	3	1
		CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2
		CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
		CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO6	3	3	3	3	2	3	3	1	3	2	1	3	3	3	3
CAL401	Computer Vision Lab	CO1	3	3	3	3	1	1	1	1	1	2	1	3	2	3	1
		CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2
		CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
		CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO6	3	3	3	3	2	3	3	1	3	2	1	3	3	3	3
CSA021	Human Computer Interaction	CO1	3	3	2	2	1	1	1	1	1	2	1	3	2	2	1
		CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2
		CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
		CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO6	3	3	3	3	2	1	1	1	1	2	1	3	3	3	3
CSA022	Introduction to Cloud Computing with Machine learning	CO1	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3
		CO2	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3
		CO3	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3
		CO4	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3
		CO5	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3

		CO6	3	3	3	3	3	3	3	1	2	3	1	3	3	3	3
CSA041	Introduction to Natural Language Processing	CO1	3	3	3	3	3	1	1	1	1	3	1	3	2	3	1
		CO2	3	3	3	3	3	1	1	1	1	3	1	3	3	3	2
		CO3	3	3	3	3	3	2	1	1	1	3	1	3	3	3	1
		CO4	3	3	3	3	3	1	2	1	1	3	1	3	3	3	3
		CO5	3	3	3	3	3	2	2	1	2	3	1	3	3	3	3
		CO6	3	3	3	3	3	3	3	1	3	3	2	3	3	3	3
CSA051	Recommender Systems	CO1	3	3	2	3	2	1	1	1	2	1		3	3	2	2
		CO2	3	3	3	3	3	2	2	1	2	2		3	3	3	2
		CO3	3	3	3	3	3	3	3	1	3	2		3	3	2	2
		CO4	3	3	3	3	3	2	2	1	3	2		3	3	3	2
		CO5	3	3	3	3	3	3	3	1	3	2		3	3	3	2
		CO6	3	3	3	3	3	3	3	1	3	3		3	3	3	3
CSA061	Robotics and Intelligent Systems	CO1	3	3	3	3	3	1	1	1	1	2	3	2	3	3	1
		CO2	3	3	3	3	3	1	2	1	2	2	3	2	3	3	2
		CO3	3	3	3	3	3	2	1	1	2	2	3	3	3	3	3
		CO4	3	3	3	3	3	1	1	1	2	2	3	2	3	3	3
		CO5	3	3	3	3	3	1	1	1	2	2	3	2	3	3	3
		CO6	3	3	3	3	3	2	2	2	3	3	2	2	3	3	3
CSE011	Mathematical Techniques	CO1	3	2											2		
		CO2	2	3	1	1	1		1			1	2	1	1	1	
		CO3	3	1	1	1			1			2	1	1	3	1	
		CO4	2	3	2	1	1		1			1	1	1	2	1	
		CO5	1	1	1	2	2		1			1	2	1	2	1	
		CO6	3	1	3	1	2		2			2	2	3	3	1	
CSE021	Introduction to Cloud Computing	CO1	2	3	1	2											
		CO2	2	2	2	3											
		CO3	1	3	1	2										2	3
		CO4	3	1	2	2										3	2

		CO5	2	2	3	1										2	2
		CO6	1	3	1	2									2	3	3
CSE022	Android Application Development	CO1					3				2			1			2
		CO2					3				2			1			2
		CO3			2		3				2			1	2		2
		CO4					3				2		2	1			2
		CO5			2	3	3		2		2		2	1			2
		CO6	1	2	3	3	3	3	3		3		3	1	3	3	3
CSA031	Digital Image Processing	CO1	3	3	3	3	1	1	1	1	1	2	1	3	2	3	1
		CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2
		CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
		CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
		CO6	3	3	3	3	2	3	3	1	3	2	1	3	3	3	3
CSA051	Wireless Networks	CO1	3		3					1							2
		CO2	3	2	3					1							2
		CO3	3	2	3					1							2
		CO4	3	2	3					1							2
		CO5	3	2	3	2	2			1							3
		CO6	3	2	3	2	2			1							3
CSE062	MOBILE COMPUTING	CO1	3	3		2	3					2			3	2	
		CO2	3	3		2	3					2			3	2	
		CO3	3	3		2	3					2			2	3	
		CO4	3	3		2	3					2			3	2	
		CO5	3	3		2	3					2			2	2	
		CO6	3	3		2	3					2			2	2	
0	Basics of Internet of Things and Raspberry	CO1	3	1	1			2	1					3	3		
		CO2	3	1	1	2		2	1					3	3		
		CO3	2	1	1		3	1	1		1	1	2	2	1	1	

	Pi	CO4	2	2	2		3	2	2	2	1	1	1	2	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI104	Introduction to IoT	CO1	3	1	1			2	1					3	3		
		CO2	2	2	1			1	3					3	3		
		CO3	3	1	1	2		2	1					3	3		
		CO4	3	2	3	2		1	2					3	3		
		CO5	3	3	3	3	3	2	3					3	3		
		CO6	2	2	2	2	3	2	3					3	3		

B.Tech-Computer Science with Specialization in Artificial Intelligence of Things (AIoT)

CSI104	Introduction to IoT	CO1	3	1	1	-	-	2	1	-	-	-	-	3	3	-	-
		CO2	2	2	1	-	-	1	3	-	-	-	-	3	3	-	-
		CO3	3	1	1	2	-	2	1	-	-	-	-	3	3	-	-
		CO4	3	2	3	2	-	1	2	-	-	-	-	3	3	-	-
		CO5	3	3	3	3	3	2	3	-	-	-	-	3	3	-	-
		CO6	2	2	2	2	3	2	3	-	-	-	-	3	3	-	-
CSI201	Embedded System	CO1	3	-	-	-	-	1	1	-	-	-	-	3	-	1	-
		CO2	3	2	-	-	3	-	-	-	2	2	1	3	2	2	-
		CO3	3	3	-	2	2	-	2	-	2	2	-	3	2	-	-
		CO4	3	3	3	3	3	2	3	2	3	3	3	3	3	2	3
		CO5	3	-	2	2	-	-	-	-	2	2	-	3	-	-	-

		CO6	3	3	3	3	3	3	3	2	3	3	2	3	3	3	3
CIP201	Embedded System Lab	CO1	3	-	-	1	1	1	1	-	3	1	-	3	1	1	1
		CO2	3	2	2	2	3	-	2	2	2	2	1	3	2	2	2
		CO3	3	3	2	2	2	-	2	2	2	2	3	3	2	-	3
		CO4	3	3	3	3	3	1	3	2	3	3	3	3	3	2	3
		CO5	3	-	2	2	-	-	1	1	2	2	3	3	2	-	-
		CO6	3	3	3	3	3	3	3	2	3	3	2	3	3	3	3
CSI202	IoT Architecture and Programming	CO1	2	-	-	-	-	-	-	-	1	-	-	2	-	2	-
		CO2	2	-	-	-	-	-	-	-	2	-	-	2	2	2	-
		CO3	2	3	2	3	3	-	2	1	2	3	-	2	3	2	-
		CO4	2	-	-	2	2	-	2	-	2	2	-	2	-	2	-
		CO5	2	2	-	-	3	-	-	-	2	3	-	2	-	2	2
		CO6	3	3	3	3	3	2	3	3	3	3	2	2	3	3	3
CIP202	IoT Architecture and Programming Lab	CO1	2	2	1	2	2	2	2	-	2	1	3	3	2	2	-
		CO2	2	2	2	1	2	-	-	-	2	-	2	3	2	2	-
		CO3	2	2	2	1	2	-	-	-	2	-	3	3	2	2	-
		CO4	2	2	2	1	2	-	-	2	2	-	3	3	2	2	-
		CO5	2	2	2	2	2	-	-	2	2	-	3	3	3	3	-
		CO6	2	2	2	2	2	3	2	2	3	1	3	3	3	3	2
CSI301	Programming with SENSEnuts IoT Platform	CO1	2	-	-	1	2	2	-	-	1	1	1	2	2	1	1
		CO2	2	2	2	1	2	2	2	-	1	1	1	2	2	1	1
		CO3	2	2	2	2	3	2	2	-	2	2	2	2	3	2	1
		CO4	2	3	2	2	3	2	2	-	2	2	2	2	3	2	1
		CO5	2	3	3	3	3	2	2	2	2	2	2	2	3	3	1

		CO6	3	3	3	3	3	2	2	3	3	3	3	3	3	3	2
CIP301	Programming with SENSE nuts IoT Platform Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI302	IoT: Sensing & Actuator Devices	CO1	2	1	1	1	1	1	1	1	-	1	-	2	1	-	-
		CO2	2	2	1	1	1	2	2	1	2	2	2	2	2	1	1
		CO3	2	2	1	1	1	2	3	1	2	2	2	2	2	1	1
		CO4	2	2	1	1	1	2	1	1	2	2	2	2	2	1	1
		CO5	2	2	1	1	1	2	1	1	2	2	2	2	2	1	1
		CO6	3	3	3	3	2	3	2	1	3	3	3	3	3	3	2
CIP302	IoT: Sensing & Actuator Devices Lab	CO1	3	2	2	2	3	1	1	-	3	3	3	2	1	-	-
		CO2	3	3	2	2	3	2	2	-	3	3	3	2	2	2	-
		CO3	3	3	2	2	3	2	3	-	3	3	3	2	2	2	-
		CO4	3	3	2	2	3	2	1	-	3	3	3	2	2	2	-
		CO5	3	3	2	2	3	2	1	2	3	3	3	2	2	2	-
		CO6	3	3	3	3	3	3	2	2	3	3	3	3	3	3	2
CSI303	Wireless Technologies for IoT	CO1	3	-	2	-	-	-	-	-	1	2	-	1	-	-	-
		CO2	3	2	-	-	-	-	-	1	1	2	-	1	-	-	-
		CO3	3	2	-	2	-	-	-	2	2	2	2	2	-	-	-
		CO4	3	2	2	-	-	-	-	2	2	2	2	2	-	-	-
		CO5	3	2	-	2	3	-	3	2	3	2	3	3	2	-	-

		CO6	3	3	3	3	3	-	3	3	3	3	3	3	2	3	3
CIP303	Wireless Technologies for IoT Lab	CO1	3	3	-	-	2	-	-	-	2	-	-	3	-	-	-
		CO2	3	3	2	-	3	3	-	-	2	-	-	3	3	2	-
		CO3	3	3	3	2	3	3	-	-	3	-	2	3	3	2	-
		CO4	3	3	3	2	3	3	-	-	3	-	2	3	3	2	-
		CO5	3	3	3	2	3	3	-	-	3	-	3	3	3	3	-
		CO6	3	3	3	3	3	3	-	-	3	-	3	3	3	3	-
CSI401	IoT Security	CO1	3	1	2	1	-	-	-	2	-	-	-	2	-	-	-
		CO2	3	1	1	1	-	-	-	2	-	-	-	2	-	-	-
		CO3	3	2	2	2	2	-	-	2	-	-	-	2	-	-	-
		CO4	3	3	3	3	2	2	-	3	3	3	3	3	2	2	3
		CO5	3	3	3	3	2	2	-	1	2	-	2	3	2	-	-
		CO6	3	3	3	3	3	3	-	2	3	3	3	3	2	3	3
CSI023	Micro-controller programming using Arduino	CO1	2	-	-	1	2	2	-	-	1	1	1	2	2	1	1
		CO2	2	2	2	1	2	2	2	-	1	1	1	2	2	1	1
		CO3	2	2	2	2	3	2	2	-	2	2	2	2	3	2	1
		CO4	2	3	2	2	3	2	2	-	2	2	2	2	3	2	1
		CO5	2	3	3	3	3	2	2	2	2	2	2	2	3	3	1
		CO6	3	3	3	3	3	2	2	3	3	3	3	3	3	3	2
CIP023	Micro-controller programming using Arduino Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2

		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI024	Raspberry Pi and its Programming	CO1	2	1	1	-	3	1	1	-	1	1	2	2	1	1	-
		CO2	2	2	2	-	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CIP024	Raspberry Pi and its Programming Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI021	Sensor-Cloud for Internet of Things	CO1	2	2	-	2	-	1	-	-	1	-	-	2	-	1	-
		CO2	2	2	-	2	-	1	-	-	1	-	-	2	-	1	-
		CO3	2	1	1	2	-	1	-	-	1	1	-	2	-	2	-
		CO4	2	2	1	2	-	1	2	-	2	1	-	3	-	2	-
		CO5	2	2	2	2	-	1	2	-	2	1	2	3	2	2	-
		CO6	3	3	3	2	3	2	2	2	2	2	2	3	3	3	2
CIP021	Sensor-Cloud for Internet of Things Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2

		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI022	Wireless Sensor Networks	CO1	2	2	-	2	-	2	-	-	1	-	-	2	-	1	-
		CO2	2	2	-	2	-	2	-	-	1	-	-	2	-	1	-
		CO3	2	1	1	2	-	2	-	-	2	2	-	2	-	2	-
		CO4	2	2	1	2	-	2	2	-	2	2	-	3	-	2	-
		CO5	2	2	3	2	-	2	2	-	3	2	2	3	2	3	-
		CO6	3	3	3	2	3	2	2	2	3	2	2	3	3	3	2
CIP022	Wireless Sensor Networks Lab	CO1	2	1	-	-	2	-	-	-	-	-	-	2	-	-	-
		CO2	3	2	1	1	3	-	2	-	1	1	1	2	1	2	2
		CO3	3	1	2	2	3	1	3	-	2	2	2	2	3	2	2
		CO4	3	2	2	2	2	1	3	-	2	2	2	2	1	2	2
		CO5	3	2	2	2	3	2	3	-	3	3	3	3	2	3	3
		CO6	3	2	3	2	3	2	3	2	3	3	3	3	3	3	3
CSI031	Artificial Intelligence for IoT	CO1	3	-	-	-	-	-	-	2	-	-	-	2	-	-	-
		CO2	3	2	2	2	3	2	-	-	2	2	2	2	2	2	2
		CO3	3	2	2	2	3	2	3	2	2	2	2	2	2	2	-
		CO4	3	3	3	3	3	-	-	-	2	2	-	2	2	2	2
		CO5	3	3	3	3	3	3	3	2	2	2	3	3	2	3	2
		CO6	3	3	3	3	3	3	-	2	3	3	3	3	2	3	3
CIP031	Artificial Intelligence for IoT Lab	CO1	2	2	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	3	3	2	2	3	2	2	2	1	1	1	3	3	2	3
		CO3	3	2	2	2	3	2	2	2	3	3	3	3	3	2	3
		CO4	3	3	2	2	3	2	2	2	3	3	3	3	3	2	3
		CO5	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3

		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CSI032	Data Analytics for IoT	CO1	2	3	-	2	-	-	-	-	-	-	-	2	-	1	-
		CO2	3	-	-	2	2	-	-	-	-	-	2	2	2	1	-
		CO3	3	2	3	2	2	-	-	-	-	2	2	2	2	1	-
		CO4	2	-	-	2	-	-	-	-	-	2	2	2	-	1	-
		CO5	3	3	3	2	2	3	2	-	2	2	2	2	2	2	-
		CO6	3	3	3	2	3	3	2	2	2	2	2	2	3	2	-
CSI033	Image Processing with IoT	CO1	3	-	-	-	2	-	-	2	-	-	-	2	-	2	-
		CO2	3	2	2	2	3	2	-	-	2	2	2	2	2	2	2
		CO3	3	2	2	2	3	2	-	2	2	2	-	2	2	2	-
		CO4	3	3	3	3	3	-	-	-	2	2	-	2	2	2	2
		CO5	3	3	3	3	3	3	-	2	2	2	-	3	2	3	2
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	2	3	3
CIP033	Image Processing with IoT Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI011	Android with IoT	CO1	2	-	-	-	2	-	-	-	-	1	2	2	-	-	-
		CO2	2	-	-	-	2	-	-	-	-	-	2	2	-	-	1
		CO3	2	2	-	2	2	2	3	-	2	2	2	3	-	-	-
		CO4	2	2	-	2	2	-	-	-	2	2	2	3	1	1	3
		CO5	2	2	2	3	2	3	2	2	3	3	2	3	3	3	3

		CO6	2	3	3	3	2	3	2	2	3	3	2	3	3	3	3
CIP011	Android with IoT Lab	CO1	2	1	1	-	3	1	1	-	2	2	2	2	1	1	-
		CO2	2	2	2	1	3	2	2	2	1	1	1	2	3	2	2
		CO3	2	2	2	1	3	2	2	2	3	3	3	3	3	2	2
		CO4	2	2	2	2	3	2	2	2	3	3	3	3	3	2	2
		CO5	3	2	2	3	3	2	2	2	3	3	3	3	3	2	2
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
CSI041	Fog Computing in IoT	CO1	2	2	-	-	-	-	-	-	-	-	-	2	-	-	-
		CO2	3	2	2	2	-	-	1	-	-	-	-	2	-	-	-
		CO3	3	2	2	2	2	-	2	-	2	2	2	3	2	2	-
		CO4	3	2	2	2	-	-	2	-	2	2	2	3	2	2	-
		CO5	3	3	3	2	3	2	2	3	3	3	3	3	2	2	2
		CO6	3	3	3	2	3	3	2	3	3	3	3	3	2	2	3
CSI042	Industrial IoT 4.0	CO1	1	-	-	-	-	1	2	2	-	-	-	2	-	-	-
		CO2	2	2	-	1	-	1	2	2	1	-	-	2	-	-	-
		CO3	2	1	-	1	2	1	2	2	2	1	2	2	1	2	-
		CO4	2	2	1	2	2	1	2	2	2	1	2	2	1	2	-
		CO5	2	2	-	2	2	1	2	2	2	2	2	2	2	3	2
		CO6	2	2	2	2	3	1	2	2	3	2	3	3	2	3	2
CSI051	IoT in Healthcare	CO1	3	2	2	-	2	3	3	2	2	2	2	3	2	2	-
		CO2	3	3	3	2	2	3	3	2	2	3	2	3	2	2	-
		CO3	3	3	3	3	2	3	3	2	3	3	3	3	3	3	-
		CO4	3	3	3	3	2	3	3	2	3	3	3	3	3	3	-
		CO5	3	3	3	3	2	3	3	2	3	3	3	3	3	3	-

		CO6	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CSI052	Drones in IoT	CO1	3	2	2	-	3	2	2	2	2	2	-	3	2	2	-
		CO2	3	3	3	2	3	3	3	2	2	3	-	3	2	2	-
		CO3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO4	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO5	3	3	3	3	3	3	3	2	3	3	3	3	3	3	-
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CSI061	Industrial IoT: Smart Manufacturing	CO1	2	2	2	2	-	2	2	-	-	1	-	2	-	-	-
		CO2	2	2	2	3	-	2	2	-	-	-	2	2	-	-	-
		CO3	3	2	2	3	3	2	2	2	-	-	-	2	-	-	2
		CO4	3	2	2	3	-	2	2	-	-	2	2	2	-	-	2
		CO5	3	2	3	3	-	2	2	-	2	2	-	2	-	-	-
		CO6	3	3	3	3	3	2	2	3	2	2	2	3	3	2	2
CSI062	IoT Applications	CO1	3	3	2	3	3	3	3	2	3	3	3	3	3	2	2
		CO2	3	3	3	3	3	3	3	2	3	3	3	3	3	2	2
		CO3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO4	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO5	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
CIP062	IoT Applications Lab	CO1	3	3	2	3	3	3	3	2	3	3	3	3	3	2	2
		CO2	3	3	3	3	3	3	3	2	3	3	3	3	3	2	2
		CO3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO4	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
		CO5	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2

		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2
B.Tech-Computer Science & Engineering with specialization in Cyber Security & Forensics																	
0	Introduction to Cyber Security & Laws	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Digital Forensics	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Digital forensics Lab	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		O6															
0	Ethical Hacking	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	ETHICAL HACKING LAB	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Security Threats Intelligence and Risk Management	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
CSC302	Cryptography and Network Security	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		O6															
CCP302	Cryptography and Network Security Lab	CO1	3	3	-	-	2	-	-	3	-	-	3	-	-	3	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	3	3
		CO3	3	3	2	-	2	-	-	-	2	-	2	3	-	-	3
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	3	-	3
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	3	-	3
		CO6	3	3	-	3	3	3	3	-	-	3	-	3	-	-	3
0	Intrusion Detection and Prevention System	CO1	3	3	-	-	2	-	-	3	-	-	3	-	-	3	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	3	3
		CO3	3	3	2	-	2	-	-	-	2	-	2	3	-	-	3
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	3	-	3
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	3	-	3
		CO6	3	3	-	3	3	3	3	-	-	3	-	3	-	-	3
0	Intrusion Detection and Prevention System Lab	CO1	3	3	-	-	2	-	-	3	-	-	3	-	-	3	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	3	3
		CO3	3	3	2	-	2	-	-	-	2	-	2	3	-	-	3
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	3	-	3
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	3	-	3
		CO6	3	3	-	3	3	3	3	-	-	3	-	3	-	-	3
0	Introduction to IoT and It's Security	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		CO6														
0	Machine Learning	CO1	3	3	3	3	3	3	2	1	1	3	1	3	2	2	1
		CO2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	Machine Learning Lab	CO1	3	3	3	3	3	3	2	3		3	3	1	3	2	3
		CO2	3	3	3	2	2	2	3	2	2	3	2	3	3	2	2
		CO3	3	3	2	3	2	1	2	2	2	3	2	2	2	3	2
		CO4	3	3	3	2	2	3	2	3	2	1	3	2	1	3	2
		CO5	3	3	2	2	1	3	2	1	3	2	1	3	2	1	3
		CO6	3	2	3	2	2	1	2	2	1	2	2	2	1	2	1
0	Open source Tools for Cyber Security & Forensics	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Open source Tools for Cyber Security & Forensics Lab	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		CO6															
0	Packet Analysis	CO1	3	3	3	3	2	1	1	1	1	3	1	3	3	3	1
		CO2	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO3	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO4	3	3	3	3	3	2	2	1	2	3	3	3	3	3	3
		CO5	3	3	3	3	3	3	3	1	3	3	3	3	3	3	3
		CO6	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
0	Packet Analysis Lab	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2
		CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2
		CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1
		CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2
		CO5	2	2	3	-	-	-	-	3	3	1	2	-	3	-	-
		CO6	3	2	-	-	-	-	-	-	-	2	3	-	2	2	-
0	Mobile and Wireless Security	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Exploit Writing	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		CO6															
CSC-032	Malware Analysis	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Cloud Security	CO1															
		CO2															
		CO3															
		CO4															
		CO5															
		CO6															
0	Penetration Testing	CO1		3	3	-	-	2	-	-	3	-	-	-	3	-	-
		CO2		3	3	2	-	-	-	-	-	-	-	-	-	-	-
		CO3		3	3	2	-	2	-	-	-	2	-	-	2	3	-
		CO4		3	3	-	3	2	3	-	2	-	-	-	-	-	3
		CO5		3	2	3	-	-	-	-	3	3	-	-	-	-	3
		CO6		3	3	-	3	3	3	3	-	-	3	3	-	3	-
0	Penetration Testing Lab	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		C	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

		CO6															
CSC-062	Web Application Security	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
CSC-022	Disaster Recovery Management	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Digital Water Marking and Steganography	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Information Security and Audit Monitoring	CO1	2	2		-	-	-	-	-	-	-	-	-	2	2	-
		CO2	2	2	2	-	-	-	-	-	-	-	-	-	2	2	-
		CO3	2	-	2	-	2	-	-	-	-	-	-	-	2	2	-
		CO4	2	-	-	2	-	2	2	-	-	-	-	-	2	2	
		CO5	-	-	-	-	2	-	2	2	2		-	-	2	-	-
		C	-	-	-	-	-	-	-	-	-	2	2	2	2	-	2

		CO6															
0	Network & Cyber Forensics	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-
0	Data Privacy and Protection	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
		CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
		CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
		CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
		CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
		CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

1.3.5.2 COURSE ARTICULATION MATRIX[2]

Course Code	Course Name	PO-1 Engineering knowledge	PO-2 Problem analysis	PO-3 Design/development of solutions	PO-4 Conduct investigations of complex problems	PO-5 Modern tool usage	PO-6 The engineer and society	PO-7 Environment and sustainability	PO-8 Ethics	PO-9 Individual and team work	PO-10 Communication:	PO-11 Project management and finance	PO-12 Life-long learning	PSO1 Familiarity and practical proficiency	PSO2 Understand, analyse and develop	PSO3 Apply standard Software
CSE113	Programming for Problem Solving	1.83	2.50	2.17	1.50	2.00				1.80		1.50		1.67	2.17	1.00
MTH142	Calculus and Abstract Algebra	3.000	3.000	2.17	2.17	2.17	1.33				1.000	1.000	1.50			
PHY125	Engineering Physics-I	3.000	3.000	2.50	2.50	2.83	1.83	1.00	1.000	1.17	1.000	1.000	1.000			
CVL103	Environmental Studies	2.000	2.000	2.67	2.17	2.67	3.000									
ARP101	Communicative English-1		2.33	2.000	2.000				2.000	2.000	2.33	2.000	2.83			
CSP113	Programming for Problem Solving Lab	2.17		2.83	1.83	1.67				2.33				2.50	2.50	1.80
CSP101	Introduction to Computer Science and Engineering	3.000	2.000				2.000		2.000				3.000	3.00	2.75	2.60
MEP106	Computer Aided Design & Drafting	2.000	2.000	2.000	2.000	3.000				2.000	2.000		3.000	3.00	3.00	
PHY162	Physics Lab	2.000	2.000	2.000	1.000	1.000	1.000	2.000	3.000	3.000	3.000	2.000	3.000	2.00		
Semester II																
CSE114	Application based Programming in Python	2.17	2.000	1.67	1.75	2.000	2.000		2.000				2.000	1.50	2.00	1.40
MTH145	Probability and Statistics	3.000	2.67	2.17	2.17	2.17	1.33				1.000	1.000	1.50			
EEE112	Principles of Electrical and Electronics Engineering	2.17	1.83	1.83	1.50							1.000				
CSE242	Data Structures	2.000	2.33	2.67	2.33	1.50				1.83			1.000	2.33	2.17	2.33

[2] Each course outcome (Based on Blooms Taxanomy-CO1, CO2, CO3, CO4, CO5, and CO6) of the course needs to map with PO. This table evolves once faculty has mapped each course outcomes of their respective course with PO's.

HMM 111	Human Value & Ethics	1.25	2.25	1.40	1.60	2.00	2.00	1.75	1.00	1.50	2.00	2.25	1.75	1.75	2.20	1.75
ARP102	Communicative English -2								3.00		3.00		3.00			
CSP105	Design and creativity Lab	3.00	2.67	2.00	2.75	2.00	2.00	2.50	3.00	3.00	3.00	2.00	3.00	2.00	2.00	1.00
CSP114	Application based Programming in Python	2.00	2.00	1.50	1.50	1.60	1.75		2.00				2.00	1.75	1.67	1.40
MEP105	Mechanical Workshop	1.67		1.00		1.60	2.00						1.83	1.40		1.00
EEP112	Principles of Electrical and Electronics Engineering	2.17	1.83	1.83	1.50							1.00				
CSP242	Data Structures Lab	2.67	2.00	2.50	2.50	2.00				2.60			1.67	2.17	2.50	2.17
Semester III																
CSE252	Computer Networks	2.25	2.00	2.00	2.00	3.00	2.00		2.00			2.00	3.00	2.00	2.40	2.00
CSE245	Discrete Structures	2.00	2.17	2.50	2.40	3.00	2.67			2.75		3.00	3.00	3.00	2.60	2.50
CSE247	Computer Organization and Architecture	3.00	2.33	2.50			2.00						2.83		1.83	2.50
CSE253	Object Oriented Programming Using Java	2.50	3.00	3.00		2.00	3.00	2.00		3.00		2.00	2.33	2.50	3.00	2.00
CSE254	Principles of Operating System	2.67	2.33	2.80	2.75	1.00			2.00	2.20	1.67	2.33	1.25	2.50	2.20	1.75
CSE255	Introduction of Entrepreneurship															
ARP207	Logical Skills Building and Soft Skills		2.00	3.00			2.00		2.00	2.33	2.00		3.00			
CSP252	Computer Networks Lab	2.25	2.00	2.00	2.00	3.00	2.00		2.00			2.00	3.00	2.00	2.40	2.00
CSP243	Object Oriented Programming Using Java	2.50	3.00	3.00		2.00	3.00	2.00		3.00		2.00	2.33	2.50	3.00	2.00
CSP244	Principles of Operating System Lab	2.67	2.33	2.80	2.75	1.00			2.00	2.20	1.67	2.33	1.25	2.50	2.20	1.75
CSP254	Project Based Learning (PBL) -1	3.00	2.67	2.00	2.75	2.00	2.00	2.50	3.00	3.00	3.00	2.00	3.00	2.00	2.00	1.00
CSP292	Summer Internship-I	2.00	2.50	2.50		2.00	2.00		3.00	3.00	3.00		2.00	1.33	2.00	
Semester IV																
BTY223	Introduction to Biology for Engineers	3.00	2.00	1.67	1.00	2.00	2.00	3.20	2.00	1.00	2.00	1.00	3.00	1.00	1.00	
CSE249	Data Base Management System	2.67	3.00	2.75	3.00	2.75	2.17		2.33	2.67	3.00	2.00	2.33	2.67	3.00	3.00

CSE251	Theory of Computation	2.83	2.60	2.83	3.00	2.40				2.40			2.60	3.00	2.40	2.25
HMM305	Management for Engineers	1.75	1.33	1.67	1.67	2.00	1.83	2.00	1.50	1.33	2.33	1.33	1.25	1.33	1.50	1.83
CSE011	Mathematical Techniques	2.33	1.83	1.60	1.20	1.50		1.20			1.40	1.60	1.40	2.17	1.00	
CSE012	Introduction to Graph Theory and its Applications	1.83	2.50	1.83	2.67	1.40	1.50	1.50			1.50	1.00	1.83	2.17	1.67	2.00
OE1	Open Elective – 1															
ARP208	Quantitative and Qualitative Aptitude Skill Building		2.000	2.000					2.000	2.000	2.20		3.000			
CSP249	Data Base Management System Lab	3.000	2.20	2.40	2.20	2.17				3.000			2.000	2.17	2.50	2.83
CSP297	Project Based Learning (PBL) -2	3.000	2.67	2.000	2.75	2.000	2.000	2.50	3.000	3.000	3.000	2.000	3.000	2.00	2.00	1.00
Semester V																
CSE354	Design and Analysis of Algorithm	2.000	2.17	1.83	2.40	2.000				2.17				2.50	2.00	2.25
CSE355	Software Engineering and Testing Methodologies															
CSE356	Research Methodology															
CSE021	Introduction to Cloud Computing	1.83	2.33	1.67	2.000									2.00	2.50	2.50
CSE023	Android Application Development	1.000	2.000	2.33	3.000	3.000	3.000	2.50		2.17		2.33	1.000	2.50	3.00	2.17
CSE024	Web Technologies	2.000	1.67	3.000	1.000	2.000	1.67	1.000		2.33		2.000	1.50	1.00	1.50	2.33
OE-2	Open Elective – 2															
ARP305	Personality Development and Decision making Skills		2.000	2.000			2.000	2.000		2.000	2.000		3.000			
CSP350	Design and Analysis of Algorithm Lab	2.50	2.67	2.50	2.40	2.000				1.83				2.50	2.33	2.20
CSP354	Project Based Learning (PBL) -3	3.000	2.17	2.000	1.80	2.50	2.000		1.17	2.000	3.000	2.25	1.33	1.83	1.80	1.75
CSP355	Software Engineering and Testing Methodologies															
CSP023	Android Application Development Lab	1.000	2.000	2.33	3.000	3.000	3.000	2.50		2.17		2.33	1.000	2.50	3.00	2.17
CSP024	Web Technologies Lab	2.000	1.67	1.67	1.000	2.000	1.67			2.20		2.000	1.33	1.00	1.20	2.25
CSP391	Summer Internship-II	1.67	2.000	1.50	2.33	2.000	2.000	1.000	1.40	1.67	3.000	1.000	1.50	1.25	2.00	2.00
CSP395	Technical Skill Enhancement Course-1 Simulation Lab	1.17	2.000	1.33	3.000	2.000	2.000	1.000		2.000	2.50	2.000	1.17	1.17	2.17	1.00

ECC301	Community Connect															
Semester VI																
CSE353	Compiler Design	2.000	2.000	2.800	3.000	2.400				2.750			2.750	2.40	2.00	2.33
CSE472	Artificial Intelligence	2.167	2.833	3.000	2.667	2.500	1.750	1.500	2.000	3.000	1.833	1.750	2.333	3.00	2.50	2.33
CSE031	Digital Image Processing	3.000	3.000	3.000	3.000	1.833	1.667	1.333	1.000	1.333	2.000	1.000	3.000	2.67	3.00	2.00
CSE032	Cryptography and Network Security	2.250	2.500	2.000	1.500	2.500	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.17	1.75	1.50
CSE041	Software Project Management	2.000		2.333	3.000	1.833	2.500		1.000	3.000	2.500	3.000	2.667			2.50
CSE042	Software Testing	2.833	2.667	2.800	2.000	2.600	1.600	3.000	1.200	2.200	3.000	3.000	2.117	2.00		3.00
CSE051	Wireless Networks	3.000	2.000	3.000	2.000	2.000			1.000							2.33
CSE052	Risk Management	2.000	2.000	2.000	2.500	2.000		1.000	1.000	2.000	1.250	1.250	1.000	1.50	1.00	1.33
CSE053	Advanced Operating System	2.667	2.333	2.800	2.750	1.000			2.000	2.200	1.667	2.333	1.250	2.50	2.20	1.75
OE-3	Open Elective – 3															
ARP306	Campus to Corporate		2.000	2.000			2.000	2.000		2.000	3.000		3.000			
CSP353	Compiler Design Lab	2.000	2.000	2.800	3.000	2.400				2.750			2.750	2.40	2.00	2.33
CSP396	Technical Skill Enhancement Course-2(Application Development Lab)	1.333	2.000	1.500	2.000	2.000	2.000	1.000		2.000	2.500	2.000	1.117	1.17	2.17	1.00
CSP398	Project Based Learning (PBL) -4	3.000	2.167	2.000	1.800	2.500	2.000		1.167	2.000	3.000	2.250	1.333	1.83	1.80	1.75
CSP472	Artificial Intelligence Lab	2.167	2.833	3.000	2.667	2.500	1.750	1.500	2.000	3.000	1.833	1.750	2.333	3.00	2.50	2.33
Semester VII																
CSE062	Mobile Computing	3.000	3.000		2.000	3.000					2.000			2.50	2.17	
CSE063	Quantum Computing	3.000	2.833	2.333	3.000	2.225	3.000	3.000	2.667	2.500	3.000	3.000	2.500	3.00	3.00	3.00
CSE071	Introduction to Internet of Things	2.667	2.000	1.833	2.500	2.667	1.833	2.200	3.000	3.000	3.000	3.000	3.000	2.83	2.00	3.00
CSE072	Parallel Computing Algorithms	3.000	2.833	2.333	3.000	2.225	3.000	3.000	2.667	2.500	3.000	3.000	2.500	3.00	3.00	3.00
CSE073	3D Printing and Software Tools	3.000	2.833	2.333	3.000	2.225	3.000	3.000	2.667	2.500	3.000	3.000	2.500	3.00	3.00	3.00
OE4	Open Elective – 4															

CSP496	Summer Internship-III	1.67	2.00	1.50	2.33	2.00	2.00	1.00	1.40	1.67	3.00	1.00	1.50	1.25	2.00	2.00
CSP497	Capstone – 1	2.17	1.83	2.50	1.83	2.17	1.60	1.60	1.00	2.00	1.83	1.00	2.00	2.17	2.67	3.00
Semester VIII																
CSP498	Capstone - 2	1.83	2.00	2.33	2.00	2.83	2.00	2.00	2.00	2.00	2.33	2.00	1.50	3.17	2.50	2.50

B.Tech-Computer Science & Engineering with specialization in Artificial Intelligence & Mach									
CSA103	Introduction To AI & ML	3.00	3.00	3.00	1.00	2.00	2.67	2.67	1.3
CSA202	Concept of Machine Learning	3.00	3.00	3.00	3.00	3.00	3.00	2.83	2.0
CAL201	Concept of Machine Learning Lab	3.00	3.00	3.00	3.00	3.00	3.00	2.83	2.0
CSA203	Concepts of Neural Networks	3.00	3.00	3.00	3.00	2.83	2.33	2.33	1.1
CSA301	Soft Computing	3.00	3.00	2.67	2.67	2.50	2.33	2.17	1.8
CSA302	Pattern Recognition	3.00	3.00	3.00	3.00	2.17	2.33	1.50	1.1
CAL302	Pattern Recognition Lab	3.00	3.00	3.00	3.00	2.17	2.33	1.50	1.1
CSA303	Deep Learning and Its Applications	3.00	3.00	3.00	3.00	2.83	2.33	2.33	1.1
CAL303	Deep Learning and Its Applications Lab	3.00	3.00	3.00	3.00	2.83	2.33	2.33	1.1
CSA402	Applications of AIML in healthcare/ ICT/ Computer Networks	3.00	3.00	3.00	3.00	3.00	1.83	2.00	3.0
CSA401	Computer Vision	3.00	3.00	3.00	3.00	1.83	1.67	1.33	1.0
CAL401	Computer Vision Lab	3.00	3.00	3.00	3.00	1.83	1.67	1.33	1.0
CSA021	Human Computer Interaction	3.00	3.00	2.83	2.83	1.83	1.33	1.00	1.0
CSA022	Introduction to Cloud Computing with Machine learning	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.0
CSA041	Introduction to Natural Language Processing	3.00	3.00	3.00	3.00	3.00	1.67	1.67	1.0
CSA051	Recommender Systems	3.00	3.00	2.83	3.00	2.83	2.33	2.33	1.0
CSA061	Robotics and Intelligent Systems	3.00	3.00	3.00	3.00	3.00	1.33	1.33	1.1
CSE011	Mathematical Techniques	2.33	1.83	1.60	1.20	1.50		1.20	
CSE021	Introduction to Cloud Computing	1.83	2.33	1.67	2.00				
CSE022	Android Application Development	1.00	2.00	2.33	3.00	3.00	3.00	2.50	
CSA031	Digital Image Processing	3.00	3.00	3.00	3.00	1.83	1.67	1.33	1.0
CSA051	Wireless Networks	3.00	2.00	3.00	2.00	2.00			1.0
CSE062	MOBILE COMPUTING	3.00	3.00		2.00	3.00			
0	Basics of Internet of Things and Raspberry Pi	2.67	1.67	1.67	2.67	3.00	2.00	1.67	2.3
CSI104	Introduction to IoT	2.67	1.83	1.83	2.25	3.00	1.67	2.17	
B.Tech-Computer Science & Engineering with specialization in Internet of Things & App									
CSI104	Introduction to IoT	2.67	1.83	1.83	2.25	3.00	1.67	2.17	
CSI201	Embedded System	3.00	2.75	2.67	2.50	2.75	2.00	2.25	2.0
CIP201	Embedded System Lab	3.00	2.75	2.40	2.17	2.40	1.67	2.00	1.8
CSI202	IoT Architecture and Programming	2.17	2.67	2.50	2.67	2.75	2.00	2.33	2.0
CIP202	IoT Architecture and Programming Lab	2.00	2.00	1.83	1.50	2.00	2.50	2.00	2.0
CSI301	Programming with SENSEnuts IoT Platform	2.17	2.60	2.40	2.00	2.67	2.00	2.00	2.5

CIP301	Programming with SENSEnuts IoT Platform Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI302	IoT: Sensing & Actuator Devices	2.17	2.00	1.33	1.33	1.17	2.00	1.67	1.00
CIP302	IoT: Sensing & Actuator Devices Lab	3.00	2.83	2.17	2.17	3.00	2.00	1.67	2.00
CSI303	Wireless Technologies for IoT	3.00	2.20	2.33	2.33	3.00		3.00	2.00
CIP303	Wireless Technologies for IoT Lab	3.00	3.00	2.80	2.25	2.83	3.00		
CSI401	IoT Security	3.00	2.17	2.33	2.17	2.25	2.33		2.00
CSI023	Micro-controller programming using Arduino	2.17	2.60	2.40	2.00	2.67	2.00	2.00	2.50
CIP023	Micro-controller programming using Arduino Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI024	Raspberry Pi and its Programming	2.33	2.00	2.00	2.50	3.00	2.00	2.00	2.20
CIP024	Raspberry Pi and its Programming Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI021	Sensor-Cloud for Internet of Things	2.17	2.00	1.75	2.00	3.00	1.17	2.00	2.00
CIP021	Sensor-Cloud for Internet of Things Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI022	Wireless Sensor Networks	2.17	2.00	2.00	2.00	3.00	2.00	2.00	2.00
CIP022	Wireless Sensor Networks Lab	2.83	1.67	2.00	1.80	2.67	1.50	2.80	2.00
CSI031	Artificial Intelligence for IoT	3.00	2.60	2.60	2.60	3.00	2.50	3.00	2.00
CIP031	Artificial Intelligence for IoT Lab	2.83	2.67	2.00	2.40	3.00	2.00	2.00	2.20
CSI032	Data Analytics for IoT	2.67	2.75	3.00	2.00	2.25	3.00	2.00	2.00
CSI033	Image Processing with IoT	3.00	2.60	2.60	2.60	2.83	2.50	3.00	2.00
CIP033	Image Processing with IoT Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI011	Android with IoT	2.00	2.25	2.50	2.50	2.00	2.67	2.33	2.00
CIP011	Android with IoT Lab	2.33	2.00	2.00	2.00	3.00	2.00	2.00	2.20
CSI041	Fog Computing in IoT	2.83	2.33	2.40	2.00	2.67	2.50	1.80	3.00
CSI042	Industrial IoT 4.0	1.83	1.80	1.50	1.60	2.25	1.00	2.00	2.00
CSI051	IoT in Healthcare	3.00	2.83	2.83	2.80	2.00	3.00	3.00	2.17
CSI052	Drones in IoT	3.00	2.83	2.83	2.80	3.00	2.83	2.83	2.17
CSI061	Industrial IoT: Smart Manufacturing	2.67	2.17	2.33	2.83	3.00	2.00	2.00	2.50
CSI062	IoT Applications	3.00	3.00	2.83	3.00	3.00	3.00	3.00	2.00
CIP062	IoT Applications Lab	3.00	3.00	2.83	3.00	3.00	3.00	3.00	2.00

B.Tech-Computer Science & Engineering with specialization in Cyber Security & For

0	Introduction to Cyber Security & Laws	3.00	2.83	2.33	3.00	2.25	3.00	3.00	2.67	2.5

0	Digital Forensics	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Digital forensics Lab	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Ethical Hacking	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	ETHICAL HACKING LAB	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Security Threats Intelligence and Risk Management	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
CSC302	Cryptography and Network Security	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
CCP302	Cryptography and Network Security Lab	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Intrusion Detection and Prevention System	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Intrusion Detection and Prevention System Lab	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Introduction to IoT and It's Security	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Machine Learning	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.83**	**2.00**	**2.0**
0	Machine Learning Lab									
0	Open source Tools for Cyber Security & Forensics	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Open source Tools for Cyber Security & Forensics Lab	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Packet Analysis	**3.00**	**3.00**	**3.00**	**3.00**	**2.83**	**2.33**	**2.33**	**1.17**	**2.3**
0	Packet Analysis Lab	**2.67**	**2.33**	**2.80**	**2.75**	**1.00**			**2.00**	**2.2**
0	Mobile and Wireless Security	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Exploit Writing	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
CSC-032	Malware Analysis	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Cloud Security									
0	Penetration Testing		**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.6**
0	Penetration Testing Lab	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
CSC-062	Web Application Security	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
CSC-022	Disaster Recovery Management	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Digital Water Marking and Steganography	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Information Security and Audit Monitoring	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.00**	**2.0**
0	Network & Cyber Forensics	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**
0	Data Privacy and Protection	**3.00**	**2.83**	**2.33**	**3.00**	**2.25**	**3.00**	**3.00**	**2.67**	**2.5**

1-Slight (Low)

2-Moderate (Medium)
3-Substantial (High)

Course Outcome

- **Course Outcomes**–What is it?
  - Course outcomes (COs) are clear statements of what a student should be able to demonstrate on completion of a course.
  - COs should be assessable and measurable knowledge, skills, abilities and attitudes that student attains by the end of the course.
  - It is generally good idea to identify between 4 and 7 outcomes.
  - All courses in a particular programme shall have their own PO.
  - Each CO is mapped to relevant PO.
  - The teaching learning process and assessment process are to be designed in a way to achieve the COs.

Beginning words for Course Outcome:

Active verbs developed based on Bloom's Taxonomy

Knowledge	Understand	Apply	Analyze	Evaluate	Create
define	explain	solve	analyze	reframe	design
identify	describe	apply	compare	criticize	compose
describe	interpret	illustrate	classify	evaluate	create
label	paraphrase	modify	contrast	order	plan
list	summarize	use	distinguish	appraise	combine
name	classify	calculate	infer	judge	formulate
state	compare	change	separate	support	invent
match	differentiate	choose	explain	compare	hypothesize
recognize	discuss	demonstrate	select	decide	substitute
select	distinguish	discover	categorize	discriminate	write
examine	extend	experiment	connect	recommend	compile
locate	predict	relate	differentiate	summarize	construct
memorize	associate	show	discriminate	assess	develop
quote	contrast	sketch	divide	choose	generalize
recall	convert	complete	order	convince	integrate
reproduce	demonstrate	construct	point out	defend	modify
tabulate	estimate	dramatize	prioritize	estimate	organize
tell	express	interpret	subdivide	find errors	prepare
copy	Identify	Manipulate	survey	grade	produce
discover	indicate	Paint	advertise	measure	rearrange
duplicate	Infer	Prepare	appraise	predict	rewrite
enumerate	relate	produce	Break down	rank	role-play

(Reference: Retrieved from http://www.teachthought.com/learning/249-blooms-taxonomy-verbs-for-critical-thinking/)

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM: I	
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
THEORY SUBJECTS							
1	CSE113	Programming for Problem Solving	3	0	0	3	
2	MTH142	Calculus and Abstract Algebra	3	1	0	4	
3	PHY125	Engineering Physics-I	3	1	0	4	
	OR						
	EEE112	Principles of Electrical and Electronics Engineering	2	1	0	3	
4	CVL103	Environmental Studies	2	0	0	0	
	OR						
	HMM111	Value & Ethics				2	
Practical/Viva-Voce/Jury							
5	ARP101	Communicative English-1	1	0	2	2	
6	CSP113	Programming for Problem Solving Lab	0	0	2	1	
7	CSP101	Introduction to Computer Science and Engineering	0	0	2	1	
8	MEP109	Basic Workshop Techniques	0	0	2	1	
9	PHY162	Physics Lab	0	0	2	1	
	OR						
	EEP112	Principles of Electrical and Electronics Engineering					
TOTAL CREDITS						**19**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM: II	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE114	Application based Programming in Python	3	0	0	3	
2	CSE242	Data Structures	3	0	0	3	
3	MTH145	Probability and Statistics	3	1	0	4	
4	PHY125	Engineering Physics-I	3	1	0	4	
	OR						
	EEE112	Principles of Electrical and Electronics Engineering	2	1	0	3	
5	HMM111	Values and Ethics	2	0	0	2	
	OR						
	CVL103	Environmental Studies				0	
Practical/Viva-Voce/Jury							
6	ARP102	Communicative English -2	1	0	2	2	
7	CSP116	Design and creativity Lab	1	0	2	2	
8	CSP242	Data Structures Lab	0	0	2	1	
9	CSP114	Application based Programming in Python	0	0	2	1	
10	MEP108	CAD Modeling and 3D Printing	1	0	2	2	
11	PHY162	Physics Lab II	0	0	2	1	
	OR						
	EEP112	Principles of Electrical and Electronics Engineering	0	0	2		
TOTAL CREDITS						**22**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM:	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requis**
			L	**T**	**P**		
THEORY SUBJECTS							

1	BTY223	Introduction to Biology for Engineers	2	0	0	2	
2	CSE245	Discrete Structures	3	1	0	4	
3	CSE247	Computer Organization and Architecture	3	0	0	3	
4	CSE252	Computer Networks	3	0	0	3	
5	CSE253	Object Oriented Programming Using Java	2	0	0	2	
6	CSE254	Principles of Operating System	2	0	0	2	
Practical/Viva-Voce/Jury							
7	ARP207	Logical Skills Building and Soft Skills	1	0	2	2	
8	CSP243	Object Oriented Programming Using Java	0	0	2	1	
9	CSP244	Principles of Operating System Lab	0	0	2	1	
10	CSP252	Computer Networks Lab	0	0	2	1	
11	CSP254	Project Based Learning (PBL) -1	0	0	4	2	
12	CSP292	Summer Internship-I	-	-	-	2	
TOTAL CREDITS						**25**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM: IV	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE249	Data Base Management System	3	0	0	3	
2	CSE251	Theory of Computation	3	1	0	4	Discrete Structures
3	HMM305	Management for Engineers	3	0	0	3	
4	PE-1	Program Elective-1				3	
	CSE011	Mathematical Techniques	3	0	0		
	CSE012	Introduction to Graph Theory and its Applications					
	CSE014/ CSP014	Advanced Java Programming	2	0	2		
5	OE1	Open Elective – 1	2	0	0	2	
Practical/Viva-Voce/Jury							
6	ARP208	Quantitative and Qualitative Aptitude Skill Building	1	0	2	2	
7	IED001	Introduction to Entrepreneurship Development	0	1	2	2	
8	CSP249	Data Base Management System Lab	0	0	2	1	
9	CSP297	Project Based Learning (PBL) -2	0	0	4	2	PBL-1
TOTAL CREDITS						**22**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM: V	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE356	Design and Analysis of Algorithm	3	0	0	3	Data Structure
2	CSE357	Software Engineering and Testing Methodologies	2	0	0	2	
3	PE2	Program Elective-2				3	Operating System(3)
	CSE021	Introduction to Cloud Computing	3	0	0		Object Oriented Programming using Java(Semester 3)
	CSE023/ CSP022	Android Application Development	2	0	2		
	CSE024/ CSP024	Web Technologies					
4	OE-2	Open Elective – 2	2	0	0	2	
Practical/Viva-Voce/Jury							
5	ARP305	Personality Development and Decision making Skills	1	0	2	2	
6	BRM003	Research Methodology	0	1	2	2	
7	CSP350	Design and Analysis of Algorithm Lab	0	0	2	1	
8	CSP391	Project Based Learning (PBL) -3	0	0	4	2	PBL-2
9	CSP357	Software Engineering and Testing Methodologies	0	0	2	1	Data Structure Lab
10	CSP398	Summer Internship-II	-	-	-	2	Operating system, DBMS
11	CSP395	Technical Skill Enhancement Course-1 Simulation Lab	0	0	2	1	
12	ECC301	Community Connect	-	-	-	2	Summer Internship-I
TOTAL CREDITS						**23**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2024						TERM: VI	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE353	Compiler Design	3	0	0	3	
2	CSE472	Artificial Intelligence	3	0	0	3	
3	PE3	Program Elective-3	3	0	0	3	
	CSE031	Digital Image Processing					
	CSE032	Cryptography and Network Security					
4	PE4	Program Elective-4	3	0	0	3	
	CSE041	Software Project Management					
	CSE042	Software Testing					
5	PE5	Program Elective-5	3	0	0	3	
	CSE051	Wireless Networks					
	CSE052	Risk Management					
	CSE053	Advanced Operating System					
6	OE-3	Open Elective – 3	3	0	0	3	
Practical/Viva-Voce/Jury							
7	ARP306	Campus to Corporate	1	0	2	2	
8	CSP353	Compiler Design Lab	0	0	2	1	Operating system Lab
	CSP472	Artificial Intelligence Lab	0	0	2	1	
9	CSP396	Technical Skill Enhancement Course-2(Application Development Lab)	0	0	2	1	
10	CSP398	Project Based Learning (PBL) -4	0	0	4	2	PBL-3
TOTAL CREDITS						**25**	

Sharda School of Engineering & Technology
Department Of Computer Science & Engineering

B.Tech-Computer Science & Engineering							
Batch: 2024-2028						**TERM: VII**	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE473	Machine Learning	3	0	0	3	
2	PE-6	Program Elective-6	3	0	0	3	
	CSE062	Mobile Computing					
	CSE063	Quantum Computing					
3	PE-7	Program Elective-7	2	0	0	2	
	CSE071	Introduction to Internet of Things					
	CSE072	Parallel Computing Algorithms					
	CSE073	3D Printing and Software Tools					
6	OE-4	Open Elective - 4	3	0	0	3	
Practical/Viva-Voce/Jury							
7	CSP473	Machine Learning Lab	0	0	2	1	
8	CSP496	Summer Internship-III	-	-	-	2	PBL-4
9	CSP497	Capstone - 1	-	-	-	2	Summer Internship-II
TOTAL CREDITS						**16**	

Sharda School of Engineering & Technology							
Department Of Computer Science & Engineering							
B.Tech-Computer Science & Engineering							
Batch: 2024-2028						TERM: VIII	
S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite
			L	T	P		
Practical/Viva-Voce/Jury							
1	CSP498	Capstone - 2	-	-	-	8	Major Project - 1
TOTAL CREDITS						8	

C. Course Syllabuses

TERM I

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: ALL		**Semester:1**	
1	Course Code	**CSE113**	Course Name: Programming for problem solving
2	Course Title	Programming for problem solving	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1. Learn basic programming constructs –data types, decision structures, control structures in C 2. learning logic aptitude programming in c language 3. Developing software in c programming	
6	Course Outcomes	Students will be able to: CO1: **demonstrate** the algorithm, Pseudo-code and flow chart for the given problem. CO2**: develop** better understanding of basic concepts of C programming. CO3: **create** and implement logic using array and function. CO4: **construct** and implement the logic based on the concept of strings and pointers. CO5: **apply** user-defined data types and I/O operations in file. CO6: **design** and develop solutions to real world problems using C.	
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm	
8	Outline syllabus		CO Mapping
	Unit 1	**Logic Building**	
	A	Flowchart: Elements, Identifying and understanding input/ output, Branching and iteration in flowchart	CO1,
	B	Algorithm design: Problem solving approach(top down/bottom up approach)	CO1
	C	Pseudo Code : Representation of different construct, writing pseudo-code from algorithm and flowchart	CO1
	Unit 2	**Introduction to C Programming**	
	A	Introduction to C programming language, Data types, Variables, Constants, Identifiers and keywords, Storage classes	CO2, CO6
	B	Operators and expressions, Types of Statements: Assignment, Control, jumping.	CO2, CO6
	C	Control statements: Decisions, Loops, break, continue	CO2, CO6
	Unit 3	**Arrays and Functions**	
	A	Arrays: One dimensional and multi-dimensional arrays:	CO3,

		Declaration, Initialization and array manipulation (sorting, searching).	CO6
	B	Functions: Definition, Declaration/Prototyping and Calling, Types of functions, Parameter passing: Call by value, Call by reference.	CO3, CO6
	C	Passing and Returning Arrays from Functions, Recursive Functions.	CO3, CO6
	Unit 4	**Pre-processors and Pointers**	
	A	Pre-processors: Types, Directives, Pre-processors Operators (#,##,\) , Macros: Types, Use, predefined Macros	CO4, CO6
	B	Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.	CO4, CO6
	C	String: Introduction, predefined string functions, Manipulation of text data, Command Line Arguments.	CO4, CO6
	Unit 5	**User Defined Data Types and File Handling**	
	A	Structure and Unions: Introduction, Declaration, Difference, Application, Nested structure, self-referential structure, Array of structures, Passing structure in function.	CO5, CO6
	B	Files: Introduction, concept of record, I/O Streaming and Buffering, Types of Files: Indexed file, sequential file and random file,	CO5, CO6
	C	Creating a data file, Opening and closing a data file, Various I/O operations on data files: Storing data or records in file, adding records, Retrieving, and updating Sequential file/random file.	CO5, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*	
	Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:** demonstrate the algorithm, Pseudo-code and flow chart for the given problem.	**PO1,PO2,PO3, PO9, PSO1,PSO2**
2.	**CO2:** develop better understanding of basic concepts of C programming. .	**PO1,PO3, PO4, PO5, PO9, PO11,PSO1,PSO2**

3.	**CO3:** : create and implement logic using array and function.	**PO1,PO3,PO4, PO9, PSO2**
4.	**CO4:** construct and implement the logic based on the concept of strings and pointers.	**PO1,PO3,PO4, PO9, PSO2**
5.	**CO5:** apply user-defined data types and I/O operations in file.	**PO1,PO3,PSO2**
6	**CO6:** design and develop solutions to real world problems using C.	**PO1,PO2,PO3,PO4,PO9, PO11,PSO1 PSO2,PSO3**

PO and PSO mapping with level of strength for Course Name Programming for problem solving (Course Code CSE 113)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	1	2	2	_	_	-	_	_	2	_	_	_	1	2	_
CO2	2	_	3	2	2	-	_	_	1	_	1	_	2	2	_
CO3	3	_	2	1	_	_	_	_	3	_	_	_	_	2	_
CO4	1	_	2	1	_	_	_	_	1	_	_	_	_	3	_
CO5	1	_	1	_	_	_	_	_	_	_	_	_	_	1	_
CO6	3	3	3	2	-	-	_	_	2	_	2	_	2	3	1

Average of non-zeros entry in following table (should be auto calculated).

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: I**	
1	Course Code	**MTH 142**	
2	Course Title	**Probability and Statistics**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.	
6	Course Outcomes	CO1: Explain the concept of probability and Random Variable. (K2,K3, K4) CO2: Explain the concept of distribution functions, densities and probability distributions; illustrate discrete and continuous probability distributions. (K1, K2, K3, K4) CO3: Describe the concept of moments, skewness and Kurtosis; evaluate correlation and regression – Rank correlation; discuss bivariate distributions and their properties . (K1, K2, K5) CO4: Discuss the basic of Curve fitting by the method of least squares; evaluate straight lines, second degree parabolas and more general curves. (K1, K2, K5) CO5: Describe and use the concepts test of significance: Large sample test for single proportion, difference of proportions; calculate single mean, difference of means, and difference of standard deviations. (K1,K2,K3) CO6: Explain the basic concepts of tests of small samples- Student's T test, Chi-square test for goodness of fit, and evaluate the result. (K2, K4, K5)	
7	Course Description	This course is an introduction to the fundamental of Mathematics. The primary objective of the course is to develop the basic understanding of statistics including measures of central tendency, correlation and regression, statistical methods of data sampling, probability and random variables and various discrete and continuous probability distributions and their properties.	
8	**Outline syllabus :Probability and Statistics**		**CO Mapping**
	Unit 1	**Basic Probability**	
	A	Probability spaces, conditional probability, Bayes' rule.	CO1

	B	Discrete random variables, Independent random variables	CO1
	C	Expectation of Discrete Random Variables, Chebyshev's Inequality	CO1
	Unit 2	**Discrete and Continuous Probability Distributions**	
	A	Discrete Probability distributions: Binomial, Poisson.	CO2
	B	Continuous random variables and their properties, distribution functions and densities.	CO2
	C	Normal, exponential and gamma distribution.	CO2
	Unit 3	**Statistics**	
	A	Moments, skewness and Kurtosis.	CO3
	B	Correlation and regression – Rank correlation.	CO3
	C	Bivariate distributions and their properties.	CO3
	Unit 4	**Applied Statistics**	
	A	Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.	CO4, CO5
	B	Test of significance: Large sample test for single proportion,	CO4, CO5
	C	Difference of proportions, single mean, difference of means, and difference of standard deviations.	CO4, CO5
	Unit 5	**Testing Hypothesis**	
	A	Test for single mean, difference of means	CO6
	B	test for ratio of variances	CO6
	C	Chi-square test for goodness of fit and independence of attributes	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 2. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint). 3. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.	
	Other References	1. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968. 2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.	

COURSE OUTCOMES – PROGRAMME OUTCOMES MAPPING TABLE

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	1	-	-	-	1	1	1
CO2	3	2	3	2	2	2	-	-	-	1	1	2
CO3	3	3	2	2	2	1	-	-	-	1	1	1
CO4	3	2	2	2	2	1	-	-	-	1	1	1
CO5	3	3	2	2	2	1	-	-	-	1	1	2
CO6	3	3	2	3	2	2	-	-	-	1	1	2

School: SET		**Batch : 2024-2028**
Program: B.Tech.		**Current Academic Year: 2024**
Branch: CSE		**Semester: II**
Branch: CSE/EC/EEE		
1	Course Code	PHY125
2	Course Title	Engineering Physics-I
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	Compulsory
5	Course Objective	To make students proverbial with the fundamental concepts of Semiconductors materials and electromagnetism and their real-life applications for configuring various electronics devices.
6	Course Outcomes	After the completion of this course, CO1: Students will learn the fundamental concepts of mobility, conductivity, electrons and holes in an intrinsic semiconductors, Donor and Acceptor impurities (n-type and p-type semiconductor), Fermi levels etc. Students will gain knowledge about the formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode etc. CO2: Students will have a clear understanding of Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation, population inversion and pumping, Ruby LASER, He-Ne Laser and semiconductor Laser. CO3: Students will show that they have learned the basics of fiber optics, Holography and its applications. CO4: Students will be able to understand the significance and applications of Maxwell's equations. CO5: Students will be able to know about the short comings of classical physics and will learn various quantum mechanical principles. CO6: Student will be familiar with the essential concepts of Semiconductors materials technology and their applications in industries.
7	Course Description	This course provides the basic foundation for understanding electronic semiconductor devices and their applications and limitations. It has introductory elements of various concept of material science. This course is essential for students who desire to specialize their engineering in Computer Sciences, Electronics, and Electronics and Electrical engineering.
8	Outline Syllabus	CO Mapping
	Unit 1	**Semiconductor Physics**
	A	Classification of Solids on the basis of energy band, electrons and holes concentration in intrinsic semiconductors, Fermi CO1

		levels, Mobility, conductivity,	
	B	Donor and Acceptor impurities (n-type and p-type semiconductor), Drift and diffusion current, Hall effect,	CO1
	C	p-n junction, types of p-n junction (step-graded and Linearly-graded junction), formation of depletion region, barrier potential, Zener diode, Avalanche and Zener breakdown.	CO1, CO6
	Unit 2	**Laser Physics and optoelectronic Sources**	
	A	Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation,	CO2
	B	population inversion and pumping, active components of laser, optical amplification or gain, threshold condition for laser action, Ruby and He-Ne lasers.	CO2, CO6
	C	Optoelectronic sources: Light emitting diode (construction, basic working principle), semiconductor laser (construction, basic working principle)	CO2, CO6
	Unit 3	**Fiber Optics and Holography**	
	A	Introduction, structure of optical fiber, Light guidance through optical fiber, Acceptance angle and Acceptance cone, Numerical aperture,	CO3
	B	Types of optical fibers, Attenuation and Dispersion in optical fiber, Applications of optical fibers.	CO3, CO6
	C	Basic principle of holography, Recording of holograms, Reconstruction process, Applications of holography.	CO3, CO6
	Unit 4	**Electromagnetism**	
	A	Gauss's theorem and its applications, Electric potential, and potential difference, Biot-Savart law and its application to current carrying circular loop	CO4
	B	Ampere's law and its applications to infinitely long straight wire, and solenoids. Electromagnetic induction; Faraday's law	CO4
	C	Maxwell's equations in free space and dielectric media, Electromagnetic waves.	CO4
	Unit 5	**Quantum Mechanics**	
	A	Inadequacy of classical Physics, Wave particle duality, de-Broglie wavelength,	CO5
	B	Davisson-Germer experiment, Schrodinger wave equation,	CO5, CO6
	C	particle in a 1-dimensional box, harmonic oscillator problem,	CO5, CO6
	Mode of Examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text books	Integrated Electronics- Millman - Halkias, Tata Mc Graw Hill	
	Other References	1. Semiconductor Devices Physics and Technology- S M Sze, John Wiley & Sons 2. Semiconductor physics and devices: basic principles-	

		Donald A. Neamen. 3. Laser and non-linear optics by B.B. laud, New Age Int. 4. Semiconductor Devices- Kanaan Kano, Pearson Education. 5. Electronics devices and circuit theory by R.L. Boylestad, Pearson. 6. Introduction to Electrodynamics, David J. Griffiths, Pearson Cambridge University Press 7. Fundamentals of Electricity and Magnetism, D. N. Vasudeva, S. Chand & Co. New Delhi 8. Fundamentals of Physics, Halliday, Resnick and Walker, John Wiley. 9. Concepts of Modern Physics, Beiser Arthur, McGraw-Hill Education	

Mapping of CO Vs Pos:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	1	2	1	1	1
CO2	3	3	2	3	3	2	1	1	1	1	1	1
CO3	3	3	2	3	3	2	1	1	1	1	1	1
CO4	3	3	3	2	3	2	1	1	1	1	1	1
CO.5	3	3	3	2	3	2	1	1	1	1	1	1
CO6	3	3	3	3	3	2	1	1	1	1	1	1

School: SET		**Batch : 2024-2028**	
Program: B. Tech		**Current Academic Year: 2024**	
Branch: All		**Semester: I**	
1	Course Code	CVL103	
2	Course Title	Environmental Science	
3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	1. Enable students to learn the concepts, principles and importance of environmental science 2. Provide students an insight of various causes of natural resource depletion and its conservation 3. Provide knowledge of layers of atmosphere with an insight of role of climatic elements in dispersion of pollutants 4. Provide detailed knowledge of causes, effects and control of different types of environmental pollution, solid waste management and its effect on climate change, global warming and ozone layer depletion 5. Provide and enrich the students about social issues such as R&R, water conservation and sustainability.	
6	Course Outcomes	CO1.Understand the scope of environmental science with knowledge about various types of natural resources and its conservation CO2. Study about the structure and composition of atmosphere and factors affecting weather and climate CO3. Study about pollution causes, effects and control and solid waste management CO4. Effect of global warming and ozone layer depletion CO5.Understand sustainable development, resettlement and rehabilitation, impact of population explosion on environment CO6.Understand overall environmental issues and its management	
7	Course Description	Environmental Science emphasises on various factors as 1. Importance and scope of environmental science 2. Natural resource conservation 3. Pollution causes, effects and control methods and solid waste management 4. Social issues associated with environment	
8	Outline syllabus		CO Mapping
	Unit 1	**General Introduction**	
	A	Definition, principles and scope of environmental science	CO1
	B	Water Resources, Land Resources, Food Resources	CO1
	C	Mineral Resources, Energy Resources, Forest Resources	CO1
	Unit 2	**Atmosphere and meteorological parameters**	
	A	Structure and composition of atmosphere	CO2
	B	Meteorological parameters: Pressure, Temperature,	CO2

		Precipitation, Humidity,	
	C	Radiation, Wind speed and direction, Wind Rose	CO2
	Unit 3	**Environmental Pollution (Cause, effects and control measures)**	
	A	Air, water, Noise and Soil pollution	CO3
	B	Case studies on pollution	CO3
	C	Solid waste management: Causes, effects and control measures of urban and industrial wastes.	CO3
	Unit 4	**Climate Change and its impact**	
	A	Concept of Global Warming and greenhouse effect	CO4
	B	Ozone layer Depletion and its consequences	CO4
	C	Climate change and its effect on ecosystem, Kyoto protocol and IPCC concerns on changing climate	CO4
	Unit 5	**Social Issues and the Environment**	
	A	Concept of sustainable development, Water conservation	CO5
	B	Resettlement and rehabilitation of people; its problems and concerns, Case studies	CO5
	C	Population explosion and its consequences	CO5
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	**1.** Joseph, Benny, "Environmental Studies", Tata Mcgraw Hill. **2.** .Howard S. Peavy, Donald R. Rowe, George Tchobanoglous. Environmental engineering Mc Graw-Hill, 1985	
	Other References		

Mapping CO-PO

CO↓ PO→	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	3	3	3
CO2	2	2	2	2	2	3
CO3	2	2	3	2	3	3
CO4	2	2	3	2	3	3
CO5	2	2	2	2	3	3
CO6	2	2	3	2	2	3

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:		**Semester: I**	
1	Course Code	EEE112	
2	Course Title	Principles of Electrical and Electronics Engineering	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Compulsory	
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipments used in engineering applications.	
6	Course Outcomes	CO1: To analyze and solve basic electrical circuits CO3: To understand the working principle of transformer and identify its applications. CO3: To understand the working principle of dc and ac motors and identify the starting methods of single phase induction motor CO4: To apply the basics of diode to describe the working of rectifier circuits such as half and full wave rectifiers CO5: To apply the concepts of basic electronic devices to design various circuits CO6: Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks	
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.	
8	Outline syllabus		CO Mapping
	Unit 1	**DC & AC Circuits (6 lectures)**	
	A	Electrical circuit elements (R, L and C), series and parallel circuits, concept of equivalent resistance, Kirchhoff current and voltage laws, star-delta conversion	CO1,CO6
	B	Analysis of simple circuits with dc excitation and Superposition Theorem, Representation of sinusoidal waveforms, peak and rms values, real power, reactive power, apparent power, power factor	CO1,CO6
	C	Introduction to three phase system, relationship between phase voltages and line voltages,	CO1,CO6
	Unit 2	**Transformer(4 lectures)**	
	A	Working principle and construction of transformer, EMF equation	CO2,CO6
	B	Efficiency of transformer, Power and distribution transformer and difference between them	CO2,CO6

	C	Transformer applications in transmission and distribution of electrical power	CO2,CO6,
	Unit 4	**Electrical Motors (6 lectures)**	
	A	Construction, working principle, torque-speed characteristic and applications of dc motor.	CO3,CO6
	B	Construction, working principle and applications of a three-phase induction motor, significance of torque-slip characteristic	CO3,CO6
	C	Working principle starting methods and applications of single phase induction motor	CO3,CO6
	Unit 4	**Semiconductor Diode and Rectifier (5 lectures)**	
	A	PN junction and its biasing	CO4,CO6
	B	Semiconductor diode, ideal versus practical diode , VI characteristics of diode	CO4,CO6
	C	Half wave and full wave rectifiers with and without filters.	CO4,CO6
	Unit 5	**Transistors (5 lectures)**	
	A	Bipolar Junction Transistor (BJT) – Construction, working principle and input-output characteristics	CO5,CO6
	B	BJT as CE amplifier and as a switch	CO5,CO6
	C	Introduction to JFET	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010. 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Publication. 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" Pearson Education, 2009	
	Other References	1. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.	

Course Articulation Matrix:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO 2	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO 3	2	2	1	-	-	-	-	-	--	-	-	-	-	-	-
CO 4	2	1	2	-	-	-	-	-	-	-	1	-	-	-	-
CO 5	3	2	1	-	-	-	-	-	-	-	1	-	-	-	-
CO 6	2	2	3	1	-	-	-	-	-	-	1	-	-	-	-

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: All		**Semester: I**	
1	Course Code	HMM111	
2	Course Title	Values and Ethics	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence	
6	Course Outcomes	1. Understand that the technical education without study of human values can generate more problems than solutions. 2. Define the principles and ideals, which help in making the judgement of what is more important. 3. See that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too. 4. Appreciate the importance of harmony in the self, family and the society for mutual fulfilment. 5. Understand the importance of harmony among human beings, other living beings and entire nature for universal equilibrium and mutual co-existence. 6. Know and practice the ethical approach in profession for continuous happiness and sustained prosperity.	
7	Course Description	Human values and embedded in all human beings it is important to sensitize them towards these values that they can use in their life to attain mutual happiness and mutual prosperity. Professional ethics will enlighten them about the value addition that can be done within the framework of ethical behaviour.	
8	Outline syllabus		CO Mapping
	Unit 1	The Need and Process for Value Education	
	A	The need, basic guidelines, content, and process for Value Education	CO1
	B	Concept of 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations	CO1,CO2
	C	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment aspirations of every human being with their correct priority	CO1,CO2
	Unit 2	Understanding Harmony in the Human Being - Harmony in Myself	
	A	Human being as a co-existence of the sentient 'I' and the material 'Body'	CO3
	B	The needs of Self ('I') and 'Body' ; Understanding the	CO3

		Body as an instrument of 'I' (I being the doer, seer and enjoyer)	
	C	The characteristics and activities of 'I' and harmony in 'I' ; Understanding the harmony of I with the Body: Correct appraisal of Physical needs, meaning of Prosperity in detail	CO3
	Unit 3	Harmony in the Family and Society	
	A	Values in human-human relationship; Trust and Respect as the foundational values of relationship	CO4
	B	Understanding the meaning of Trust; Difference between intention and competence; The meaning of Respect; Difference between respect and differentiation; the other salient values in relationship	CO4
	C	Harmony in the society (society being an extension of family; Visualizing a universal harmonious order in society - from family to world family	CO4
	Unit 4	Harmony in the Nature and Existence	
	A	The harmony in the Nature	CO5
	B	Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature	CO5
	C	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space	CO5
	Unit 5	Competence in professional ethics	
	A	Ability to utilize the professional competence for augmenting universal human order	CO6
	B	Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,	CO6
	C	Ability to identify and develop appropriate technologies and management patterns for above production systems.	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA / ESE	
		25% / 75%	
	Text book/s*	1. R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", Excel books, New Delhi	
	Other References	1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. 3. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Publishers. Starting out with Python, Tony Gaddis, Pearson	

CO and PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1						3	1	3	1			3					
CO2						2	1	3	2			3					
CO3						3	1	3	2			3					
CO4						3	1	3	2			3					
CO5						3	3	3	3		2	3					
CO6						3	3	3	2		3	3					

School: SET | SOL | SMFE | SBS-BBA | SBSR | SOE | SAP		**Batch : 2024-2028**
Program: B.Tech		**Current Academic Year: 2024**
Branch: All		**Semester: I**
1	Course Code	ARP102
2	Course Title	Aptitude Reasoning & Personality
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Core

5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.	
6	Course Outcomes	After completion of this course, students will be able to: CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts CO2 Synthesize complex concepts and present them in creative writing CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice CO4 Determine their role in achieving team success through defining strategies for effective communication with different people CO5 Realize their potentials as human beings and conduct thelves properly in the ways of world. CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning	
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.	
8	Outline syllabus – ARP 102		**CO Mapping**
	Unit 1	Acquiring Vision, Goals, Strategies through Audio-visual Language Texts and Creative Writing	
	A	Pursuit of Happiness / Goal Setting & Value Proposition in life,12 Angry Men / Ethics & Principles,The King's Speech / Mission statement in life | strategies & Action Plans in Life	**CO1**
	B	Story Reconstruction - Positive Thinking,Theme based Story Writing - Positive attitude	**CO2**
	C	Learning Diary Learning Log – Self-introspection	**CO2**
	Unit 2	Writing Skills 1 and MTI Reduction/Neutral Accent through Classroom Sessions & Practice	

	A	Precis, Paraphrasing, Essays (Simple essays)	**CO2**
	B	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs, Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	**co3**
	C	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress	
	Unit 3	Gauging MTI Reduction Effectiveness through Free Speech	
	A	Jam sessions	**CO3**
	B	Extempore	**CO3**
	C	Situation-based Role Play	**CO3**
	Unit 4	Leadership and Management Skills and Universal Human Values	
	A	Innovative Leadership and Design Thinking, Ethics and Integrity	**CO4**
	B	Love & Compassion, Non-Violence & Truth, Righteousness, Peace	**CO5**
	C	Service, Renunciation (Sacrifice)	**CO5**
	Unit 5	Introduction to Quantitative aptitude & Logical Reasoning	
	A	Analytical Reasoning	**CO6**
	B	Number Systems and its Application in Solving Problem	**CO6**
	C	Puzzle Solving	**CO6**
	Mode of examination	Lab	
	Weightage Distribution	CA: 30 | CE: 30 | ETE: 40	
	Text book/s*	.Wren, P.C.&Martin H. *High English Grammar and Composition*, S.Chand& Company Ltd, New Delhi. ● Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication ● Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press.	
	Other References	The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts.	PO9, PO10, PO11,PO12
2.	CO2 Synthesize complex concepts and present them in creative writing.	PO9, PO10, PO11,PO12
3.	CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice.	PO9, PO10, PO11,PO12
4.	CO4 Determine their role in achieving team success through defining strategies for effective communication with different people	PO9, PO10, PO11,PO12
5.	CO5 Realize their potentials as human beings and conduct thelves properly in the ways of world..	PO9, PO10, PO11,PO12
6.	CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning	PO9, PO10, PO11,PO12

PO and PSO mapping with level of strength for Course

Code_ Course Name	CO's	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSC302_Cryptography and Network Security	CO1	-	-		-	-	-	-	-	1	3	1	2	-	-	-
	CO2	-	-	-	–	-	-	-	-	1	3	1	2	-	-	--
	CO3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
	CO4	-	-	-	-	-	–	–	-	1	3	1	2	-	-	-
	CO5	-	-	-		-	-	-		1	3	1	2	-	-	-
	CO6	-	-	-	-	-	-	-	-	1	3	1	2	-	-	--

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PS O2	PS O3
ARP - 102	Communicative English - 2									1	3	1	2			

School: SET		**Batch : 2024-2028**			
Program: B.Tech.		**Current Academic Year: 2024**			
Branch: CSE		**Semester: I**			
1	Course Code	CSP113			
2	Course Title	Programming for problem solving Lab			
3	Credits	1			
4	Contact Hours (L-T-P)	0-0-2			
	Course Status	Compulsory			
5	Course Objective	1. Learn basic programming constructs –data types, decision structures, control structures in C 2. learning logic aptitude programming in C language 3. Developing software in c programming			
6	Course Outcomes	Students will be able to: CO1: **Implement** core concept of c Programming CO2: **develop** programs using Array and String CO3: **create** Functions for any problem CO4: **Use** Union and Structure to write any program CO5: **implement** concept of Pointers CO6**: design** a real world problem with the help of c programming			
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm			
8	Outline syllabus				CO Mapping
	Unit 1	**Logic Building**			**CO1, CO6**
		Draw flowchart for finding leap year			
		Write a c Program to Add Two Integers			
		Write a program to create a calculator			
	Unit 2	**Introduction to C Programming**			**CO2, CO6**
		Write a c program to convert length meter to cm			
		Write a c program to convert temp			
		Write a c program to swap two numbers			
	Unit 3	**Arrays and Functions**			**CO3, CO6**
		Write a c program to calculate the average using arrays			
		Write a c program to find the largest element of the array			
	Unit 4	**Pre-processors and Pointers**			**CO4, CO6**
		Write a c program to swap two values using pointers			
		Write a c program to find largest number from array using pointers			
	Unit 5	**User Defined Data Types and File Handling**			**CO5, CO6**
		Write a c program to store information of a student using structure			
		Write a c program to store information of a student using union			
	Mode of examination	Lab			
	Weightage	CE	CE	ESE	

	Distribution	30%	30%	40%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*			
	Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999			

Course outline
This course implements array and pointer and Recursive applications. The course talks primarily about Array, string, functions, structure & union and Pointers etc.

Course Evaluation	
Attendance	None
Any other	CA judged on the practicals conducted in the lab , weightage may be specified
References	
Text book	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*
Other References	1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999
Softwares	Turbo C

PO and PSO mapping with level of strength for Course Name Programming for problem solving Lab **(Course Code CSP113)**

Course Code_ Course Name	**CO's**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSP113_ Programming for problem solving Lab	**CO1**	**2**	**-**	**3**	**2**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**
	CO2	**3**	**-**	**3**	**2**	**2**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**3**	**3**	**1**
	CO3	**2**	**-**	**3**	**1**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**3**	**2**
	CO4	**1**	**-**	**2**	**1**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**2**	**-**
	CO5	**2**	**-**	**3**	**2**	**2**	**-**	**-**	**-**	**3**	**-**	**-**	**-**	**3**	**2**	**2**
	CO6	**3**	**-**	**3**	**3**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**2**	**3**	**2**

Average of non-zeros entry in following table (should be auto calculated).

Course Code	**Course Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSP 113	Programming for problem solving Lab	2.17		2.83	1.83	1.67	-	-	-	2.33	-	-	-	2.50	2.50	1.80

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: I**	
1	Course Code	EEP112	
2	Course Title	Principles of Electrical and Electronics Engineering Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipment‟s used in engineering applications.	
6	Course Outcomes	After successful completion of this course the student will be able to:CO1: To configure and analyze any given circuit. CO2: To inspect the working of transformer and calculate its efficiency CO3: To understand the working of dc and ac motors and measure its various operating parameters. CO4: To design rectifier circuits such as half and full wave rectifiers and observe its output waveforms. CO5: To obtain the characteristics of BJT. CO6:Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks.	
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on DC & AC Circuits**	CO1
		To configure a dc circuit on breadboard, and measure voltage/current across/through each element	CO1
		To verify Kirchhoff‟s Laws	CO1
		To verify Superposition Theorem	CO1
		To find the real power, reactive power, apparent power and power factor of RL & RC load	CO1
	Unit 2	**Practical related to Transformers**	
		To find the efficiency of transformer by obtaining its losses.	CO2,CO6
	Unit 3	**Practical related to Electrical Motors**	
		To study cut-section of DC motor and induction motor.	CO3,CO6
		To start the DC motor and reverse its direction of rotation.	CO3,CO6
		To start an induction motor and reverse its direction of rotation.	CO3,CO6
	Unit 4	**Practical related to Diode and Rectifier**	
		To determine voltage-current characteristic of diode	CO4,CO6
		To assemble and test half wave and full wave rectifier circuits for their input and output waveform	CO4,CO6

	Unit 5	**Practical related to Transistors**				
		To determine input and output characteristics of BJT			CO5, CO6	
		Validation of BJT as a switch			CO5, CO6	
	Mode of examination	Lab				
	Weightage Distribution	CE	CE	ESE		
		30%	30%	40%		
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", TataMcGraw Hill, 2010-ISBN:9780070146112 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering",Pearson Publication.ISBN: 9789332586505 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" PearsonEducation, 2009 ISBN: 9780131189058				
	Other References	1. V. D. Toro, "Electrical Engineering Fundamentals", PrenticeHall India, 1989. SBN:9780132471312				

CO , PO & PSO MAPPING:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
EEP112.1	3	3	3	1	1	-	-	-	-	-	-	-	2	-	-
EEP112.2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	1
EEP112.3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
EEP112.4	2	1	3	-	-	-	-	-	-	-	-	-	2	-	-
EEP112.5	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-
EEP112.6	2	2	2	2	2				2		2	-	1	1	-
EEP112	2.1	1.6	2	1	1	-	-	-	1	-	1	-	1.1	1	1

School: SET		**Batch : 2024-2028**	
Program:B.Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester:I**	
1	Course Code	CSP101	
2	Course Title	Introduction to Computer Science and Engineering	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	UG	
5	Course Objective	1. To familiarize the students about the importance of Undergraduate course on Computer Science & Engineering. 2. To discuss recent developments in hardware and software environments. 3. To focus future application areas of Computer Science and Engineering. 4. To discuss various research and development options in Computer Science and Engineering.	
6	Course Outcomes	**The student should be able to:** CO1. Understand the technical aspects of Computer Science & Engineering Course. CO2. Perceive some knowledge about programming in various applications. CO3. Acquire basic understanding about computer networking and related technology. CO4. Enhance some fundamental knowledge of DBMS including application areas. CO5. Understand the current trends in computing in discovering wisdom/knowledge and future prediction. CO6. Implement the course program on AWS cloud.	
7	Course Description	This course focuses application areas of Computer Science and Engineering for students admitted in undergraduate program. The purpose of B. Tech. in Computer Science & Engineering is to be given through this course to students.	
8	Outline syllabus		CO Mapping
	Unit 1	**Hardware aspect of Computer Science & Engineering**	
	A	History of Computing Systems, Computer Basics and Computer Organization.	CO1
	B	Computer Architecture, Introduction to various connecting devices.	
	C	Recent additions – IoT, Robotics and new alternate architectures.	
	Unit 2	**Programming Aspects**	

	A	Basics of Programming, Programming Paradigms, System Software versus Application Software.			CO2
	B	Hard Computing versus Soft Computing, Data Structures and Algorithms.			
	C	Computer Graphics, Multimedia, Computer Vision.			
	Unit 3	**Computer Networking and DBMS**			
	A	Introduction to Networking, Various terminologies, Client Server Technology, Web Technology. Introduction to network security			CO3
	B	Introduction to DBMS, DBMS versus File System, Relational DBMS.			
	C	Big Data Analytics & Scientific Computing			
	Unit 4	**Artificial Intelligence**			
	A	Information Processing and Retrieval , Basics of Artificial Intelligence			CO4
	B	Basics of Pattern Recognition			
	C	Basics of Machine Learning			
	Unit 5	**Cloud Computing: Amazon Web Services**			
	A	Concept of Cloud Computing and Virtualization, Real life applications.			CO5
	B	AWS services:EC2,Lambda,S3,IAM,VPC			
	C	AWS security services, management services			
	Mode of examination	Lab			
	Weightage Distribution	CE	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Introduction to Computer, Peter Norton, 7/e, 2017, Tata McGraw Hill Publishing. 2. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter 3. AWS Educate Cloud Practitioners Essentials contents			
	Other References	1. Foundations of Computer Science, B A Forouzan& F Mosharraf, 2/e, 2008, Delmar Learning. 2. https://aws.amazon.com/developer/language/java/ 3. https://aws.amazon.com/developer/			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the technical aspects of Computer Science &Engineering Course.	PO1, PO2, PO12, PSO3
2.	**CO2:**Perceive some knowledge about programming in various applications.	PO1, PO12, PSO1, PSO3
3.	**CO3:** Acquire basic understanding about computer networking and related technology.	PO1, PO2, PO12, PSO2, PSO3
4.	**CO4:**Enhance some fundamental knowledge of DBMS including application areas.	PO1, PO12, PSO2, PSO3
5.	**CO5:** Understand the current trends in computing in discovering wisdom/knowledge and future prediction.	PO1, PO6, PO8, PO12, PSO2, PSO3

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	2	-	-	-	-	-	-	-	-	-	3	3	-	3
CO 2	3	2	-	-	-	-	-	-	-	-	-	3	-	3	2
CO 3	3	2	-	-	-	-	-	-	-	-	-	3	-	2	3
CO 4	3	-	-	-	-	-	-	-	-	-	-	3	-	3	2
CO 5	3	-	-	-	-	2	-	2	-	-	-	3	-	3	3

School: SET		**Batch:** 2024-2025
Program:		B.Tech.
Branch: All		**Semester:** I/II
1	**Course Code**	MEP109
2	**Course Title**	Basic Workshop Techniques
3	**Credits**	1
4	**Contact Hours (L-T-P)**	0-0-2
	Course Status	Compulsory
5	**Course Objective**	The objective of this course is to make the students, familiar with the modern-day manufacturing processes, introduce the various hand tools and equipment, acclimatize with the measuring devices, and performs basic machine tool operations in various machine tools.
6	**Course Outcomes**	After the successful completion of course, students will be able to: CO1: Demonstrate fundamental carpentry skills, including precise measurement, cutting, joining, and assembly. CO2: Utilize basic metal working skills including bending, forming and Forging to fabricate products with accuracy and structural integrity. CO3: Make use of thermal metal joining processes like brazing and soldering. CO4: Employ competent welding techniques, ensuring strong and secure joint connections while adhering to safety standards. CO5: Demonstrate working proficiency in machining skills to produce components with tight tolerances and smooth surface finish. CO6: Understand the basics of electrical circuits with electrical components and apparatus.

7	**Course Description**	**Forging Shop:** Simple exercises based on black smithy operations such as upsetting, practice of S-Hook from circular bar using hand forging operations. **Carpentry Shop:** Study of different types of wood, Carpentry Tools, Equipment and different joints. **Brazing and soldering:** Introduction to thermal processes like brazing and soldering, which are extensively used for joining of most common engineering materials such as metals **Welding Shop:** Introduction, Study of Tools and welding Equipment (Gas and Arc welding), Selection of welding electrode and current, Bead practice and Practice of Butt Joint, Lap Joint. **Machine Shop:** Study of machine tools in particular Lathe machine (different parts, different operations, study of cutting tools), Demonstration of different operations on Lathe machine, Practice of Facing, plane turning, step turning, taper turning, knurling and parting and study of quick return mechanism of Shaper. **Electrical circuits:** Understanding the basics of electrical wiring which is a system of electrical conductor, components and apparatus, for conveying electric power from the source to the point of use.	
8	**List of Experiments**		**Course Outcome**
	Experiment 1	Craft a dovetail lap joint in the carpentry shop utilizing a power jig saw.	CO1
	Experiment 2	Construct a cross-half lap joint in the carpentry shop using a power jig saw	CO1
	Experiment 3	Shape an S-shaped hook from a provided circular rod through hand forging.	CO2
	Experiment 4	Form a cone from sheet metal using soldering techniques.	CO3
	Experiment 5	Create a butt joint with mild steel strips employing brazing methods.	CO3
	Experiment 6	Utilize arc welding to fabricate a lap joint with the provided mild steel pieces.	CO4
	Experiment 7	Execute step turning and taper turning operations on the assigned work piece.	CO5
	Experiment 8	Design and prepare wiring to control two lamps connected in series through a single switch (series connection).	CO6
	Value Added Experiments		

	Experiment 9		Design and prepare wiring to control two lamps connected in parallel by one switch. (parallel connection)	CO6
	Experiment 10		Employee arc welding to make a corner joint with the given two M.S. pieces.	CO6
Mode of examination			**Lab**	
Weightage Distribution		CE	CE	ESE
		30%	30%	40%
	Textbook/s*	1. Raghuwanshi B.S., Workshop Technology Vol.I & II, Dhanpath Rai & Sons. 2. Kannaiah P and Narayana K.L.Workshop Manual,2nd Edn, Sci tech publishers. 3. John K.C., Mechanical WorkshopPractice.2ndEdn. PHI2010.		

chool: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: Mechanical Engineering		**Semester: I**	
1	Course Code	PHY 162	
2	Course Title	Physics Lab 2	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.	
6	Course Outcomes	On successful completion of the course the students will have: CO1: Knowledge and study of basic physics experiments based on Semiconductors, energy band gap, planck constant etc. CO2: Use the concept of electricity and magnetism to find out variation of magnetic field through a current carrying coil and hall effect CO3: Understand and learn how to determine specific resistance CO4: Understand and perform laser-based experiments. CO5: Knowledge and study of various optical experiments. CO6: Apply the mathematical concepts/equations to obtain quantitative results and ability to conduct, analyze and interpret experiments	
7	Outline Syllabus		CO Mapping
	Unit 1		
	A B C	1. To determine Energy band gap of a semiconductor using Four Probe method. 2. To determine the variation of magnetic field along the axis of a current carrying coil and estimate the radius of the coil. 3. To study Hall effect and determine the Hall coefficient, carrier density and the mobility of a semiconductor material	CO1 CO2,CO6
	Unit 2		
	A B C	4. To draw hysteresis curve (B-H curve) of a specimen in the form of a transformer on a C.R.O. And to determine its hysteresis loss 5. To determine the Planck's constant by measuring radiation in a fixed spectral range. 6. To determine the specific resistance of the material of a given wire using Carey Foster's bridge.	CO2,CO6
	Unit3		
	A B C	7. To determine the diameter of thin wire by diffraction using laser. 8. To determine the wavelength of laser light by diffraction at a single slit. 9. To determine slit width of single and double slit by using Laser.	CO3,CO6 CO4,CO6
	Unit 4		

	A B C	10. To determine the wavelength of prominent lines of mercury by plane diffraction grating. 11. To determine the wavelength of monochromatic light by Newton's Ring method.	CO4,CO6
	Unit 5		
	A B C	12. To determine the focal length of the combination of two lenses separated by a distance with the help of a nodal slide and to verify the formula. 13. To verify Stefan's Law.	CO5,CO6 CO5,CO6
	Mode of Examination	Lab	
	Weightage Distribution	CE / 30%	CE / 30% / ESE / 40%
	Text books	1. B.Sc. Practical Physics- Harnam Singh, S. Chand Publishing. 2. B.Sc. Practical Physics- C L Arora, S. Chand Publishing.	
	Other References	1. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co. 2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New	

CO –PO MAPPING

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
CO162.1	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.2	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.3	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.4	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.5	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.6	2	2	2	1	1	1	2	3	3	3	2	3	2

TERM II

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
Branch:		**CSE**	
1	Course Code	CSE114	
2	Course Title	Application Based Programming in Python	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	Emphasis is placed on procedural programming, algorithm design, and language constructs common to most high-level languages through Python Programming.	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1. Demonstrate program by using decision and repetition structures CO2. Construct programs by using Python lists, tuples and dictionaries CO3. Apply methods and functions to improve readability of programs. CO4. Develop logical problem using object-oriented programming methodology. CO5. Analyze and implement various tools, modules and packages for python. CO6. Design efficient logical solution for any given real life problem by using concise and efficient algorithms	
7	Course Description	Python is a language with a simple syntax, and a powerful set of libraries. It is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	CO1
	A	Python Environment, Variables, Data Types, Operators.	
	B	**Conditional Statements:** If, If- else, Nested if-else. **Looping:** For, While, Nested loops.	
	C	**Control Statements:** Break, Continue, And Pass. Comments	
	Unit 2	**List, Tuple and Dictionaries**	CO1, CO2
	A	**Lists and Nested List:** Introduction, Accessing list, Operations, Working with lists, Library Function and Methods with Lists	
	B	Strings: Introduction, Accessing items of a string, Operations, Working, Library Functions and Methods with strings. **Tuple:** Introduction, Accessing tuples, Operations, Working, Library Functions and Methods with Tuples.	
	C	Sets: Introduction, Operations, Working, functions with	

		sets. Difference between set and lists. **Dictionaries :**Introduction, Accessing values in dictionaries, Working with dictionaries, Library Functions	
	Unit 3	**Functions and Exception Handling**	CO3
	A	**Functions:** Defining a function, Calling a function, Types of functions, Function Arguments	
	B	Anonymous functions, Global and local variables	
	C	**Exception Handling**: Definition, Except clause, Try, finally clause, User Defined Exceptions	
	Unit 4	**OOP and File Handling**	CO4
	A	**OOPs concept** : Class and object, Attributes, Abstraction, Encapsulation, Polymorphism and Inheritance	
	B	Static and Final Keyword, Access Modifiers and specifiers, scope of a class	
	C	File Handling: Introduction, File Operations	
	Unit 5	**Application based programming**	CO5,CO6
	A	**Modules& packages :**Importing module, Math module, Random module, creating Modules	
	B	Introduction to Numpy, pandas, Matplotlib	
	C	**Applications: Searching Linear Search, Binary Search. Sorting: Bubble Sort**	
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	The Complete Reference Python, Martin C. Brown, McGraw Hill	
	Other References	1. Introduction to computing in problem solving using Python, E Balahurusamy, McGraw Hill 2. Introduction to programming using Python, Y. Daniel Liang, Pearson 3. Mastering Python, Rick Van Hatten, Packet Publishing House 4. Starting out with Python, Tony Gaddis, Pearson	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. Demonstrate program by using decision and repetition structures	PO1,PO2,PO3,PO8,PO12,PSO2
2.	CO2. Apply methods and functions to improve readability of programs.	PO1,PO2,PO3,PO4,PO8,PO12,PSO2,PSO3
3.	CO3. Construct programs by using Python lists, tuples and	PO1,PO2,PO3,PO8,PO12,PSO1, PSO2,PSO3

	dictionaries	
4.	CO4. Develop logical problem using object-oriented programming methodology.	PO1,PO2,PO3, PO4,PO5,PO6,PO8, PO12,PSO1,PSO2,PSO3
5.	CO5. Analyze and implement various tools, modules and packages for python	PO1,PO2,PO3, PO4,PO5,PO6, PO8, PO12,PSO1,PSO2,PSO3
6.	CO6. Create efficient logical solution for any given real life problem by using concise and efficient algorithms.	PO1,PO2,PO3, PO4,PO5,PO6, PO8, PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Application Based Programming in Python (Course Code CSE 114)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CSE114_Application Based programming in Python	CO1	2	1	1					2				2		1	
	CO2	2	2	2	1				2				2		2	1
	CO3	2	2	1					2				2	1	2	1
	CO4	2	2	2	2	1	2		2				2	1	2	2
	CO5	2	2	2	2	3	2		2				2	2	2	1
	CO6	3	3	2	2	2	2		2				2	2	3	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE114	Application Based programming in Python	2.1	2	1.7	1.2	1	1	-	2	-	-	-	2	1	2	1.1

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:		**Semester: II**	
1	Course Code	EEE112	
2	Course Title	Principles of Electrical and Electronics Engineering	
3	Credits	3	
4	Contact Hours (L-T-P)	2-1-0	
	Course Status	Compulsory	
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipments used in engineering applications.	
6	Course Outcomes	CO1: To analyze and solve basic electrical circuits CO3: To understand the working principle of transformer and identify its applications. CO3: To understand the working principle of dc and ac motors and identify the starting methods of single phase induction motor CO4: To apply the basics of diode to describe the working of rectifier circuits such as half and full wave rectifiers CO5: To apply the concepts of basic electronic devices to design various circuits CO6: Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks	
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.	
8	Outline syllabus		CO Mapping
	Unit 1	**DC & AC Circuits (6 lectures)**	
	A	Electrical circuit elements (R, L and C), series and parallel circuits, concept of equivalent resistance, Kirchhoff current and voltage laws, star-delta conversion	CO1,CO6
	B	Analysis of simple circuits with dc excitation and Superposition Theorem, Representation of sinusoidal waveforms, peak and rms values, real power, reactive power, apparent power, power factor	CO1,CO6
	C	Introduction to three phase system, relationship between phase voltages and line voltages,	CO1,CO6
	Unit 2	**Transformer(4 lectures)**	
	A	Working principle and construction of transformer, EMF equation	CO2,CO6
	B	Efficiency of transformer, Power and distribution transformer and difference between them	CO2,CO6

	C	Transformer applications in transmission and distribution of electrical power	CO2,CO6,
	Unit 4	**Electrical Motors (6 lectures)**	
	A	Construction, working principle, torque-speed characteristic and applications of dc motor.	CO3,CO6
	B	Construction, working principle and applications of a three-phase induction motor, significance of torque-slip characteristic	CO3,CO6
	C	Working principle starting methods and applications of single phase induction motor	CO3,CO6
	Unit 4	**Semiconductor Diode and Rectifier (5 lectures)**	
	A	PN junction and its biasing	CO4,CO6
	B	Semiconductor diode, ideal versus practical diode , VI characteristics of diode	CO4,CO6
	C	Half wave and full wave rectifiers with and without filters.	CO4,CO6
	Unit 5	**Transistors (5 lectures)**	
	A	Bipolar Junction Transistor (BJT) – Construction, working principle and input-output characteristics	CO5,CO6
	B	BJT as CE amplifier and as a switch	CO5,CO6
	C	Introduction to JFET	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010. 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Publication. 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" Pearson Education, 2009	
	Other References	2. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.	

Course Articulation Matrix:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	1	-	-	-	-	-	--	-	-	-	-	-	-
CO4	2	1	2	-	-	-	-	-	-	-	1	-	-	-	-
CO5	3	2	1	-	-	-	-	-	-	-	1	-	-	-	-
CO6	2	2	3	1	-	-	-	-	-	-	1	-	-	-	-

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	**MTH 145**	
2	Course Title	**Probability and Statistics**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to familiarize the students with statistical techniques. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling various problems in the discipline.	
6	Course Outcomes	CO1: Explain the concept of probability and Random Variable. (K2,K3, K4) CO2: Explain the concept of distribution functions, densities andprobability distributions; illustrate discrete and continuous probability distributions. (K1, K2, K3, K4) CO3: Describe the concept of moments, skewness and Kurtosis; evaluate correlation and regression – Rank correlation; discuss bivariate distributions and their properties . (K1, K2, K5) CO4: Discuss the basic of Curve fitting by the method of least squares; evaluate straight lines, second degree parabolas and more general curves. (K1, K2, K5) CO5: Describe and use the concepts test of significance: Large sample test for single proportion, difference of proportions; calculate single mean, difference of means, and difference of standard deviations. (K1,K2,K3) CO6: Explain the basic concepts of tests of small samples- Student's T test, Chi-square test for goodness of fit, and evaluate the result. (K2, K4, K5)	
7	Course Description	This course is an introduction to the fundamental of Mathematics. The primary objective of the course is to develop the basic understanding of statistics including measures of central tendency, correlation and regression, statistical methods of data sampling, probability and random variables and various discrete andcontinuous probability distributions and their properties.	
8	**Outline syllabus :Probability and Statistics**		**CO Mapping**
	Unit 1	**Basic Probability**	
	A	Probability spaces, conditional probability, Bayes' rule.	CO1
	B	Discrete random variables, Independent random	CO1

		variables	
	C	Expectation of Discrete Random Variables, Chebyshev's Inequality	CO1
	Unit 2	**Discrete and Continuous Probability Distributions**	
	A	Discrete Probability distributions: Binomial, Poisson.	CO2
	B	Continuous random variables and their properties, distribution functions and densities.	CO2
	C	Normal, exponential and gamma distribution.	CO2
	Unit 3	**Statistics**	
	A	Moments, skewness and Kurtosis.	CO3
	B	Correlation and regression – Rank correlation.	CO3
	C	Bivariate distributions and their properties.	CO3
	Unit 4	**Applied Statistics**	
	A	Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.	CO4, CO5
	B	Test of significance: Large sample test for single proportion,	CO4, CO5
	C	Difference of proportions, single mean, difference of means, and difference of standard deviations.	CO4, CO5
	Unit 5	**Testing Hypothesis**	
	A	Test for single mean, difference of means	CO6
	B	test for ratio of variances	CO6
	C	Chi-square test for goodness of fit and independence of attributes	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA | ESE	
		25% | 75%	
	Text book/s*	4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 5. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint). 6. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.	
	Other References	3. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968. 4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000. Veerarajan T., Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi, 2010.	

COURSE OUTCOMES – PROGRAMME OUTCOMES MAPPING TABLE

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	3	1	-	-	-	1	1	1
CO2	3	2	3	2	2	2	-	-	-	1	1	2
CO3	3	3	2	2	2	1	-	-	-	1	1	1
CO4	3	2	2	2	2	1	-	-	-	1	1	1
CO5	3	3	2	2	2	1	-	-	-	1	1	2
CO6	3	3	2	3	2	2	-	-	-	1	1	2

School: SET		**Batch : 2024-2028**
Program: B.Tech.		**Current Academic Year: 2024**
Branch: CSE		**Semester: II**
Branch: CSE/EC/EEE		
1	Course Code	PHY125
2	Course Title	Engineering Physics-I
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	Compulsory
5	Course Objective	To make students proverbial with the fundamental concepts of Semiconductors materials and electromagnetism and their real-life applications for configuring various electronics devices.
6	Course Outcomes	After the completion of this course, CO1: Students will learn the fundamental concepts of mobility, conductivity, electrons and holes in an intrinsic semiconductors, Donor and Acceptor impurities (n-type and p-type semiconductor), Fermi levels etc. Students will gain knowledge about the formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode etc. CO2: Students will have a clear understanding of Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation, population inversion and pumping, Ruby LASER, He-Ne Laser and semiconductor Laser. CO3: Students will show that they have learned the basics of fiber optics, Holography and its applications. CO4: Students will be able to understand the significance and applications of Maxwell's equations. CO5: Students will be able to know about the short comings of classical physics and will learn various quantum mechanical principles. CO6: Student will be familiar with the essential concepts of Semiconductors materials technology and their applications in industries.
7	Course Description	This course provides the basic foundation for understanding electronic semiconductor devices and their applications and limitations. It has introductory elements of various concept of material science. This course is essential for students who desire to specialize their engineering in Computer Sciences, Electronics, and Electronics and Electrical engineering.
8	Outline Syllabus	CO Mapping
	Unit 1	**Semiconductor Physics**
	A	Classification of Solids on the basis of energy band, electrons and holes concentration in intrinsic semiconductors, Fermi CO1

		levels, Mobility, conductivity,	
	B	Donor and Acceptor impurities (n-type and p-type semiconductor), Drift and diffusion current, Hall effect,	CO1
	C	p-n junction, types of p-n junction (step-graded and Linearly-graded junction), formation of depletion region, barrier potential, Zener diode, Avalanche and Zener breakdown.	CO1, CO6
	Unit 2	**Laser Physics and optoelectronic Sources**	
	A	Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation,	CO2
	B	population inversion and pumping, active components of laser, optical amplification or gain, threshold condition for laser action, Ruby and He-Ne lasers.	CO2, CO6
	C	Optoelectronic sources: Light emitting diode (construction, basic working principle), semiconductor laser (construction, basic working principle)	CO2, CO6
	Unit 3	**Fiber Optics and Holography**	
	A	Introduction, structure of optical fiber, Light guidance through optical fiber, Acceptance angle and Acceptance cone, Numerical aperture,	CO3
	B	Types of optical fibers, Attenuation and Dispersion in optical fiber, Applications of optical fibers.	CO3, CO6
	C	Basic principle of holography, Recording of holograms, Reconstruction process, Applications of holography.	CO3, CO6
	Unit 4	**Electromagnetism**	
	A	Gauss's theorem and its applications, Electric potential, and potential difference, Biot-Savart law and its application to current carrying circular loop	CO4
	B	Ampere's law and its applications to infinitely long straight wire, and solenoids. Electromagnetic induction; Faraday's law	CO4
	C	Maxwell's equations in free space and dielectric media, Electromagnetic waves.	CO4
	Unit 5	**Quantum Mechanics**	
	A	Inadequacy of classical Physics, Wave particle duality, de-Broglie wavelength,	CO5
	B	Davisson-Germer experiment, Schrodinger wave equation,	CO5, CO6
	C	particle in a 1-dimensional box, harmonic oscillator problem,	CO5, CO6
	Mode of Examination	Theory	
	Weightage Distribution	CA | ESE	
		25% | 75%	
	Text books	Integrated Electronics- Millman - Halkias, Tata Mc Graw Hill	
	Other References	1. Semiconductor Devices Physics and Technology- S M Sze, John Wiley & Sons 2. Semiconductor physics and devices: basic principles-	

		Donald A. Neamen. 3. Laser and non-linear optics by B.B. laud, New Age Int. 4. Semiconductor Devices- Kanaan Kano, Pearson Education. 5. Electronics devices and circuit theory by R.L. Boylestad, Pearson. 6. Introduction to Electrodynamics, David J. Griffiths, Pearson Cambridge University Press 7. Fundamentals of Electricity and Magnetism, D. N. Vasudeva, S. Chand & Co. New Delhi 8. Fundamentals of Physics, Halliday, Resnick and Walker, John Wiley. 9. Concepts of Modern Physics, Beiser Arthur, McGraw-Hill Education	

Mapping of CO Vs Pos:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	2	2	1	1	1	2	1	1	1
CO2	3	3	2	3	3	2	1	1	1	1	1	1
CO3	3	3	2	3	3	2	1	1	1	1	1	1
CO4	3	3	3	2	3	2	1	1	1	1	1	1
CO.5	3	3	3	2	3	2	1	1	1	1	1	1
CO6	3	3	3	3	3	2	1	1	1	1	1	1

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	HMM111	
2	Course Title	Values and Ethics	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence	
6	Course Outcomes	1. Understand that the technical education without study of human values can generate more problems than solutions. 2. Define the principles and ideals, which help in making the judgement of what is more important. 3. See that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too. 4. Appreciate the importance of harmony in the self, family and the society for mutual fulfilment. 5. Understand the importance of harmony among human beings, other living beings and entire nature for universal equilibrium and mutual co-existence. 6. Know and practice the ethical approach in profession for continuous happiness and sustained prosperity.	
7	Course Description	Human values and embedded in all human beings it is important to sensitize them towards these values that they can use in their life to attain mutual happiness and mutual prosperity. Professional ethics will enlighten them about the value addition that can be done within the framework of ethical behaviour.	
8	Outline syllabus		CO Mapping
	Unit 1	The Need and Process for Value Education	
	A	The need, basic guidelines, content, and process for Value Education	CO1
	B	Concept of 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations	CO1,CO2
	C	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment aspirations of every human being with their correct priority	CO1,CO2
	Unit 2	Understanding Harmony in the Human Being - Harmony in Myself	
	A	Human being as a co-existence of the sentient 'I' and the material 'Body'	CO3

	B	The needs of Self ('I') and 'Body' ; Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)	CO3
	C	The characteristics and activities of 'I' and harmony in 'I' ; Understanding the harmony of I with the Body: Correct appraisal of Physical needs, meaning of Prosperity in detail	CO3
	Unit 3	Harmony in the Family and Society	
	A	Values in human-human relationship; Trust and Respect as the foundational values of relationship	CO4
	B	Understanding the meaning of Trust; Difference between intention and competence; The meaning of Respect; Difference between respect and differentiation; the other salient values in relationship	CO4
	C	Harmony in the society (society being an extension of family; Visualizing a universal harmonious order in society - from family to world family	CO4
	Unit 4	Harmony in the Nature and Existence	
	A	The harmony in the Nature	CO5
	B	Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature	CO5
	C	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space	CO5
	Unit 5	Competence in professional ethics	
	A	Ability to utilize the professional competence for augmenting universal human order	CO6
	B	Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,	CO6
	C	Ability to identify and develop appropriate technologies and management patterns for above production systems.	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", Excel books, New Delhi	
	Other References	1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. 3. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Publishers. Starting out with Python, Tony Gaddis, Pearson	

CO and PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1						3	1	3	1			3					
CO2						2	1	3	2			3					
CO3						3	1	3	2			3					
CO4						3	1	3	2			3					
CO5						3	3	3	3		2	3					
CO6						3	3	3	2		3	3					

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	CVL-103	
2	Course Title	Environmental Science	
3	Credits	0	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	1. Enable students to learn the concepts, principles and importance of environmental science 2. Provide students an insight of various causes of natural resource depletion and its conservation 3. Provide knowledge of layers of atmosphere with an insight of role of climatic elements in dispersion of pollutants 4. Provide detailed knowledge of causes, effects and control of different types of environmental pollution, solid waste management and its effect on climate change, global warming and ozone layer depletion 5. Provide and enrich the students about social issues such as R&R, water conservation and sustainability.	
6	Course Outcomes	CO1.Understand the scope of environmental science with knowledge about various types of natural resources and its conservation CO2. Study about the structure and composition of atmosphere and factors affecting weather and climate CO3. Study about pollution causes, effects and control and solid waste management CO4. Effect of global warming and ozone layer depletion CO5.Understand sustainable development, resettlement and rehabilitation, impact of population explosion on environment CO6.Understand overall environmental issues and its management	
7	Course Description	Environmental Science emphasises on various factors as 1. Importance and scope of environmental science 2. Natural resource conservation 3. Pollution causes, effects and control methods and solid waste management 4. Social issues associated with environment	
8	Outline syllabus		CO Mapping
	Unit 1	**General Introduction**	
	A	Definition, principles and scope of environmental science	CO1
	B	Water Resources, Land Resources, Food Resources	CO1
	C	Mineral Resources, Energy Resources, Forest Resources	CO1
	Unit 2	**Atmosphere and meteorological parameters**	
	A	Structure and composition of atmosphere	CO2
	B	Meteorological parameters: Pressure, Temperature, Precipitation, Humidity,	CO2

	C	Radiation, Wind speed and direction, Wind Rose	CO2
	Unit 3	**Environmental Pollution (Cause, effects and control measures)**	
	A	Air, water, Noise and Soil pollution	CO3
	B	Case studies on pollution	CO3
	C	Solid waste management: Causes, effects and control measures of urban and industrial wastes.	CO3
	Unit 4	**Climate Change and its impact**	
	A	Concept of Global Warming and greenhouse effect	CO4
	B	Ozone layer Depletion and its consequences	CO4
	C	Climate change and its effect on ecosystem, Kyoto protocol and IPCC concerns on changing climate	CO4
	Unit 5	**Social Issues and the Environment**	
	A	Concept of sustainable development, Water conservation	CO5
	B	Resettlement and rehabilitation of people; its problems and concerns, Case studies	CO5
	C	Population explosion and its consequences	CO5
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Joseph, Benny, "Environmental Studies", Tata Mcgraw Hill. 2. .Howard S. Peavy, Donald R. Rowe, George Tchobanoglous. Environmental engineering Mc Graw-Hill, 1985	
	Other References		

CO-PO Mapping

CO↓ PO→	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	2	3	3	3	3
CO2	2	2	2	2	2	3
CO3	2	2	3	2	3	3
CO4	2	2	3	2	3	3
CO5	2	2	2	2	3	3
CO6	2	2	3	2	2	3

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	CSE242	
2	Course Title	Data Structures	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1. Learn the basic concepts of Data Structures and algorithms. 2. Design and Implementation of Various Basic and Advanced Data Structures. 3. Learn the concepts of various searching, Sorting and Hashing Techniques. 4. Choose the appropriate data structures and algorithm design method for a specified application.	
6	Course Outcomes	CO1: **Select** appropriate data structures as applied to specified problem definition. CO2: **Choose** the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently. CO3 **Represent** and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications. CO4: **Compare** various techniques for searching and sorting. CO5: **Design** and implement an appropriate hashing function for an application CO6: **Formulate** new solutions for programing problems or improve existing code using learned algorithms and data structures	
7	Course Description	This course starts with an introduction to data structures with its classification, efficiency of different algorithms, array and pointer based implementations and Recursive applications. As the course progresses the study of Linear and Non-Linear data structures are studied in details. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Data Structure – Definition, Operations and Applications, Abstract Data Types, Algorithm – Definition, Introduction to Complexity, Big OH notation, Time and Space tradeoffs.	CO1
	B	Dynamic Memory Allocation(Malloc, calloc, realloc, free), Recursion – Definition, Examples- Tower of Hanoi problem, Tail Recursion	CO1
	C	Arrays: Implementation of One Dimensional Arrays, Multidimensional Arrays, Applications of Arrays, Address Calculation, Matrix Operations, Sparse martices	CO1
	Unit 2	**Linked List**	

	A	Concept of Linked List, Garbage Collection, Overflow and Underflow, Array Implementation and Dynamic Implementation of Singly Linked Lists	CO2
	B	Array Implementation and Dynamic Implementation of Doubly Linked List, Circularly Linked List	CO3
	C	Operations on a Linked List- Insertion, Deletion, Traversal, Polynomial Representation and Addition	CO2
	Unit 3	**Stack and Queue**	
	A	Stacks: Definitions, Primitive operations, Application of stacks – Conversion of Infix Expression to Postfix form, Evaluation of Postfix Expressions	CO3
	B	Queues: Definition, Primitive Operations, Implementation of Circular Queues, Priority Queues	CO3
	C	Deques, Application of Queues. Implementation - Linked Stacks, Linked Queues.	CO3
	Unit 4	**Tree and Graphs**	
	A	Trees: Terminologies, Binary tree, Representation, Applications, Binary search Tree – Operations on Binary Search Trees (Traversing, Insertion, deletion etc.), Binary Search Algorithm, AVL Tree	CO4, CO6
	B	Graph: Terminology, Representation, Traversals- Depth First Search, Breadth First Search.	CO4, CO6
	C	Graph Applications – Minimum Spanning Trees – Prim's and Kruskal's Algorithms	CO4, CO6
	Unit 5	**Searching, Sorting and Hashing**	
	A	Implementation and Analysis - Linear search, Binary Search	CO5, CO6
	B	Implementation and Analysis- Bubble Sort, Insertion Sort, Selection Sort, Tree sort	CO5, CO6
	C	Hashing: Concepts and Applications, Hash Functions, Collisions, Methods of Resolving Collisions	CO5, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA / ESE	
		25% / 75%	
	Text book/s*	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH	
	Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication 3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill 4. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**Select** appropriate data structures as applied to specified problem definition.	PO1, PO3, PO9, PSO1, PSO2
2.	**Choose** the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently.	PO1, PO2, PO3, PO9, PSO1, PSO2, PSO3
3.	**Represent** and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications.	PO1, PO2, PO3, PO4, PO9, PSO1, PSO2
4.	**Compare** various techniques for searching and sorting.	PO3, PO9, PO12, PSO1, PSO2
5.	**Design** and implement an appropriate hashing function for an application	PO1, PO2, PO3, PO4, PO5, PO9, PSO1, PSO2, PSO3
6.	**Formulate** new solutions for programing problems or improve existing code using learned algorithms and data structures	PO1, PO3, PO4, PO5, PO9, PSO1, PSO2, PSO3

PO and PSO mapping with level of strength for Course Name Data Structures (Course Code CSE 242)

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	2	-	-	-	-	-	2	-	-	-	2	2	-
CO2	1	2	3	-	-	-	-	-	1	-	-	-	3	1	2
CO3	2	3	3	2	-	-	-	-	2	-	-	-	2	3	-
CO4	-	-	2	-	-	-	-	-	3	-	-	1	2	2	-
CO5	3	2	3	2	1	-	-	-	2	-	--	-	3	2	2
CO6	2	-	3	3	2	-	-	-	1	-	-	-	2	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CSE242	Data structures	2	2.33	2.67	2.33	1.5	-	-	-	1.83	-	-	1	2.33	2.17	2.33

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**
Program: B.Tech.		**Current Academic Year: 2024**
Branch: CSE		**Semester: II**
Branch:		**Aptitude Reasoning & Personality**
1	Course Code	**ARP - 102**
2	Course Title	Communicative English -2
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Core
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.
6	Course Outcomes	After completion of this course, students will be able to: CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts CO2 Synthesize complex concepts and present them in creative writing CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice CO4 Determine their role in achieving team success through defining strategies for effective communication with different people CO5 Realize their potentials as human beings and conduct thelves properly in the ways of world. CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.
8	Outline syllabus – ARP 102		CO Mapping
	Unit 1	Acquiring Vision, Goals, Strategies through Audio-visual Language Texts and Creative Writing	
	A	Pursuit of Happiness / Goal Setting & Value Proposition in life,12 Angry Men / Ethics & Principles,The King's Speech / Mission statement in life | strategies & Action Plans in Life	CO1
	B	Story Reconstruction - Positive Thinking,Theme based Story Writing - Positive attitude	CO2
	C	Learning Diary Learning Log – Self-introspection	CO2

	Unit 2	Writing Skills 1 and MTI Reduction/Neutral Accent through Classroom Sessions & Practice	
	A	Precis, Paraphrasing, Essays (Simple essays)	CO2
	B	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs, Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	co3
	C	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress	
	Unit 3	Gauging MTI Reduction Effectiveness through Free Speech	
	A	Jam sessions	CO3
	B	Extempore	CO3
	C	Situation-based Role Play	CO3
	Unit 4	Leadership and Management Skills and Universal Human Values	
	A	Innovative Leadership and Design Thinking, Ethics and Integrity	CO4
	B	Love & Compassion, Non-Violence & Truth, Righteousness, Peace	CO5
	C	Service, Renunciation (Sacrifice)	CO5
	Unit 5	Introduction to Quantitative aptitude & Logical Reasoning	
	A	Analytical Reasoning	CO6
	B	Number Systems and its Application in Solving Problem	CO6
	C	Puzzle Solving	CO6
	Mode of examination	Lab	
	Weightage Distribution	CE / CE / ESE	
		30% / 30% / 40%	
	Text book/s*	.Wren, P.C.&Martin H. *High English Grammar and Composition*, S.Chand& Company Ltd, New Delhi. ● Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication ● Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press.	
	Other References	The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts.	PO9, PO10, PO11,PO12
2.	CO2 Synthesize complex concepts and present them in creative writing.	PO9, PO10, PO11,PO12
3.	CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice.	PO9, PO10, PO11,PO12
4.	CO4 Determine their role in achieving team success through defining strategies for effective communication with different people	PO9, PO10, PO11,PO12
5.	CO5 Realize their potentials as human beings and conduct thelves properly in the ways of world..	PO9, PO10, PO11,PO12
6.	CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning	PO9, PO10, PO11,PO12

PO and PSO mapping with level of strength for Course

Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ARP102	CO1	-	-		-	-	-	-	-	1	3	1	2	-	-	-
	CO2	-	-	-	–	-	-	-	-	1	3	1	2	-	-	--
	CO3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
	CO4	-	-	-	-	-	–	–	-	1	3	1	2	-	-	-
	CO5	-	-	-		-	-	-		1	3	1	2	-	-	-
	CO6	-	-	-	-	-	-	-	-	1	3	1	2	-	-	--

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
ARP - 102	Communicative English - 2									1	3	1	2			

Strength of Correlation

1. Addressed to*Slight (Low=1) extent* *2.* Addressed to*Moderate (Medium=2) extent*
3. Addressed to*Substantial (High=3) extent*

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE			
1	Course Code	**CSP116**	
2	Course Title	Design & Creativity Lab (DCL)	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Compulsory	
5	Course Objective	1.To align student to think out of box and identify a realistic problem or project 2.To understand the significance of problem and its scope 3.To develop skills to frame small project for the defined problem	
6	Course Outcomes	Students will be able to: CO1: Identify and formulate problem statements using systematic approach for real world/proposed problems. CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others. CO3: Design the problem solution as per the problem statement framed. CO4: Classify and understand project solution and design solution parameters. CO5: Fabricate the solution by using C programming/other known programming. CO6: Develop future work areas from the project outcome.	
7	Course Description	In DCL, the students will learn the fundamentals of defining the problem, formulating the problem statement, identifying the required skills for developing the solution based on a given problem identified based on the understanding of the programming language studied in the previous semester or known.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Formation of Teamwork and problem solving, and Project Assignment.	CO1, CO2
	Unit 2	Develop the ability to communicate effectively and identify proposed problems.	CO2, CO3
	Unit 3	Design proposed solution for identified problem statement.	CO3
	Unit 4	Develop a solution set and obtain the appropriate results for defined parameters.	CO3, CO4
	Unit 5	Demonstrate and execute projects with the team. Determine future work based on the final outcome.	CO4, CO5, CO6
		The report *should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Solution Detail. Reports.* *References if any.*	

		The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.			
	Mode of examination	Lab			
	Weight age Distribution	CA	CE	ETE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify and formulate problem statements using systematic approach for real world/proposed problems.	PO1, PO2, PO4, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others.	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12 ,PSO3
3.	CO3: Design the problem solution as per the problem statement framed.	PO1, PO2, PO5, PO9, PO10, PO11, PO12, PSO1,PSO2
4.	CO4: Classify and understand project solution and design solution parameters.	PO1, PO2, PO6, PO9, PO10, PO11, PO12,PSO2
5.	CO5: Fabricate the solution by using C programming/other known programming.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12 PSO1,PSO2, PSO3
6.	CO6: Develop future work areas from the project outcome.	PO1, PO2, PO4, PO9, PO10, PO11, PO12,PSO3

PO and PSO mapping with level of strength for Course Name Design & Creativity Lab **(Course Code CSP116)**

CO/PO Mapping

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low

Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3			1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	
CO4	3	3	-	-	-	2	-	-	3	3	2	3		2	
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
CO6	3	3	-	3	-	-	-	-	3	3	2	3			1
AvgPO attained	3	2.7	0.34	1.84	0.67	0.67	0.84	0.5	3	3	2	3	1	1.4	0.5

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	CSP114	
2	Course Title	Application Based Programming in Python Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Emphasis is placed on procedural programming, algorithm design, and language constructs common to most high level languages through Python Programming.	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1: Develop program based on procedural statements like assignments, conditional statements and loops. CO2: Compare and implement different data types of python. CO3: Create programs by using function and function call. CO4: Formulate clear and accurate logical solution by using OOPS CO5: Apply different modules, packages available in python. CO6: Design real life situational problems and think creatively about solutions of them.	
7	Course Description	Python is a language with a simple syntax, and a powerful set of libraries. It is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming.	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on conditional statements and control structures**	
		1. Program to implement all conditional statements 2. Program to implement different control structures	CO1,C06
	Unit 2	**Practical related to List, Tuples and dictionaries**	
		1. Program to implement operations on lists 2. Program to implement operations on Dictionary **3.** Program to implement operations on Tuple	CO2,CO6
	Unit 3	**Practical related to Functions and Exception Handling**	
		1. Program to implement Exception	CO3,CO6

		Handling **2.** Program to use different functions			
	Unit 4	**Practical related to Object Oriented Programming**			
		1. Program to use object oriented concepts like inheritance, overloading polymorphism etc. 2.Program for file handling			CO4,CO6
	Unit 5	**Practical related to Modules and Applications**			
		1.Program to use modules and package 2.Program to implement searching and sorting			CO5,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. The Complete Reference Python, Martin C. Brown, McGraw Hill			
	Other References	1. Introduction to computing in problem solving using Python, E Balagurusamy, McGraw Hill 2. Introduction to programming using Python, Y. Daniel Liang, Pearson 3. Mastering Python, Rick Van Hatten, Packet Publishing House 4. Starting out with Python, Tony Gaddis, Pearson			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Develop program based on procedural statements like assignments, conditional statements and loops.	PO1,PO2,PO3,PO4,PO8,PO12,PSO2
2.	CO2: Compare and implement different data types of python.	PO1,PO2,PO3,PO4,PO5,PO8,PO12,PSO2,PSO3
3.	CO3: Create programs by using function and function call.	PO1,PO2,PO3,PO4,PO5,PO6,PO8,PO12, PSO1,PSO2,PSO3
4.	CO4: Formulate clear and accurate logical solution by using OOPS	PO1,PO2,PO3,PO4,PO5,PO6,PO8,PO12, PSO1,PSO2,PSO3
5.	CO5: Apply different modules, packages available in python.	PO1,PO2,PO3,PO4,PO5,PO6,PO8,PO12, PSO1,PSO2,PSO3
6.	CO6: Design real life situational problems and think creatively about solutions of them.	PO1,PO2,PO3,PO4,PO5,PO6,PO8,PO12, PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name-Application Based Programming in Python Lab **(Course Code CSP 114)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSP114_Application Based programming in Python Lab	CO1	1	1	1	1				2				2		1	
	CO2	2	2	1	1	2			2				2		1	1
	CO3	2	2	1	1	1	1		2				2	1	2	1
	CO4	2	2	2	2	1	1		2				2	2	2	1
	CO5	2	2	2	2	2	2		2				2	2	2	2
	CO6	3	3	2	2	2	3		2				2	2	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO 2	PSO3
CSP114	Application Based programming in Python Lab	2	2	1.5	1.5	1.3	1.2	-	2	-	-	-	2	1.2	1.7	1.2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024-25**	
Branch:ALL		**Semester : I**	
1	**Course Code**	**MEP 108**	
2	**Course Title**	**CAD Modeling and 3D Printing**	
3	**Credits**	**2**	
4	**Contact Hours (L-T-P)**	**1-0-2**	
	Course Status	**Compulsory**	
5	**Course Objective**	**The objective of this introductory course is to make students familiar with computer-aided drafting/ design and 3D printing, introduce them about the basic commands, tools and dimension techniques for creation and presentation of various engineering models by using Fusion 360 software and 3D printer, which helps in visualization and problem solving in engineering disciplines.**	
6	**Course Outcomes**	**After successful completion of this course the student will be able to** **CO1: Construct orthographic projections from a pictorial view.** **CO2: Identify the fundamental features of CAD, 3D workspace and user interface.** **CO3: Create an engineering drawing by implementing dimension techniques.** **CO4: Apply knowledge of drawing, editing and viewing tool to create 3D model in software** **CO5: Create 3D model in to printing components.** **CO6: Apply the knowledge of modeling and 3D printing for various industrial practice.**	
7	**Course Description**	**Projection of Points, Lines and Plane Surface** **Orthographic projection - First angle projection - projection of points and Projection of straight lines inclined to one principal plane –Projection of planes inclined to one principal plane.** **Projection of Solids** **Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.** **Conversion of Pictorial drawings into Orthographic views** **Representation of Three-Dimensional objects – Layout of views- Sketching of multiple views from pictorial view of object.** **Solid Modeling** **Modeling of simple solids in Polyhedra, Regular and Irregular polyhedra, solids of revolution. 3D Modelling on Fusion 360 – To prepare part model using 2 D drawing and with basic extrusion and revolve commands.** **3D Printing** **Introduction to 3 D printing, Slicing / Pre-processing, Fused deposition modelling technique, design and print 3D models like stepped shaft model and flange coupling model.**	
8	**Outline syllabus**		
	List of Experiments	**Name of Experiment**	**CO Mapping**
	Experiment 1	**Drawing the orthographic views from the given pictorial views with representing the dimensions.**	**CO1**
	Experiment 2	**Working with coordinates in the 3D workspace, creating sketch of the given figures and using smart dimensioning in Fusion 360.**	**CO2**

	Experiment 3	**Creating the 3D part model of the given drawings by using extrude, revolve.**	**CO2**
	Experiment 4	**Creating the 3D part model of the given pictures.**	**CO3**
	Experiment 5	**Creating 3D model of Piston using advanced tools like hole, round, chamfer.**	**CO4**
	Experiment 6	**Draw 3D-isometric view keys, cotters and pins, and derive front view, top view and side view**	**CO3**
	Experiment 7	**Studying the parts and process of 3D Printing**	**CO4**
	Experiment 8	**Creating the 3D printed model of mobile phone back cover**	**CO5**
	Experiment 9	**Creating the 3D printed model of wrench**	**CO5**
	Experiment 10	**Creating the 3D printed model U bracket**	**CO5**
Value added Experiments			
Experiment 11. To develop the part drawing in the orthographic projections and 3D model of connecting rod.			**CO6**
Experiment 12. To develop 3D printed Sharda University logo for memento.			**CO6**
9	**Mode of examination**	**Lab**	
10	**Weightage Distribution**	**CA** / **CE** / **ETE**	
		30% / **30%** / **40%**	
11	**Text book/s***	**1. Ibrahim Zaid, "CAD/CAM- Theory and Practice", McGraw Hill, International Edition.** **2. 3D Printing Understanding Additive Manufacturing, Andreas Gebhardt, Julia Kessler and Laura Thurn About the book**	
12	**Software**	**Fusion 360**	

Course Articulation Matrix

COs	**PO 1**	**PO 2**	**PO3**	**PO 4**	**PO5**	**PO 6**	**PO 7**	**PO 8**	**PO9**	**PO 10**	**PO 11**	**PO 12**
CO1	**3**					**3**						
CO2	**2**	**3**				**1**				**3**		
CO3			**3**									
CO4		**2**		**3**							**2**	**1**
CO5					**3**							**3**
CO6							**3**	**3**	**3**			
MEP XXX	**2.5**	**2.5**	**3**	**3**	**3**	**2.33**	**3**	**3**	**3**	**3**	**2**	**2.33**

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High).**

School:		**Sharda School of Engineering and Technology**
Programme:		**B.Tech**
Branch: ALL		**Semester: I/II**
1	**Course Code**	**MEP 108**
2	**Course Title**	**CAD Modelling and 3D Printing Laboratory**
3	**Credits**	**2**
4	**Contact Hours (L-T-P)**	**(1-0-2)**
5	**Total contact hours:**	**45**

Date	Topics to be Covered/Title		Total Lectures/ Unit
Week 1	**Orthographic projection, First angle projection**	**Unit 1**	**9**
	EX 1 - Drawing the orthographic views from the given pictorial views.		
Week 2	**Projection of points and Projection of straight lines**		
	EX 2 - Working with coordinates in the 3D workspace, creating sketch of the given figures and using smart dimensioning in Fusion 360.		
Week 3	**Conversion of Pictorial drawings into Orthographic views**		
	EX 3 - Creating the 3D part model of the given drawings by using extrude, revolve.		
Week 4	**Introduction to Solid Modeling**	**Unit 2 & Unit 3**	**9**
	EX 4 - Creating the 3D part model of the given pictures.		
Week 5	**Regular and Irregular solids**		
	EX 5 - Creating 3D model of Piston using advanced tools like hole, round, chamfer.		
Week 6	**Projection of Solids**		
	EX 6 - Draw 3D-isometric view keys, cotters and pins, and derive front view, top view and side view		
Week 7	**Representation of Three-Dimensional objects**	**Unit 4 & 5**	**9**
	EX 7 - Studying the parts and process of 3D Printing		

Week 8	**Introduction to 3D printing**		
	EX 8 - Creating the 3D printed model of mobile phone back cover		
Week 9	**Fused deposition modelling technique**		
	EX 9 - Creating the 3D printed model of wrench		
Week 10	**Slicing in 3D Printing**	**Unit 4 & 5**	**9**
	EX 10 - Creating the 3D printed model U bracket		
Week 11	**Pre-processing in 3D Printing**		
	EX 11 - To develop the part drawing in the orthographic representation and 3D model of connecting rod.		
Week 12	**Representing the dimensions in Orthographic views**		
	EX 12 - To develop 3D print of Sharda University logo		
Week 13	**Design and print of 3D**	**Revision**	**9**
	Revision class of Orthographic projection		
Week 14	**Revision class of solid modelling**		
	Revision class Projection of Points, Lines and Plane Surface		
Week 15	**Revision class 3D Printing**		

School: SET		**Batch : 2024-2028**	
Program: B.Tech.		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	CSP242	
2	Course Title	Data Structure Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. Learn the basic concepts of Data Structures and algorithms. 2. Design and Implementation of Various Basic and Advanced Data Structures. 3. Learn the concepts of various searching, Sorting and Hashing Techniques. 4. Choose the appropriate data structures and algorithm design method for a specified application.	
6	Course Outcomes	CO1: **Implement** operation like traversing, insertion, deletion, searching etc. on various data structures. CO2 **apply** linear data structure(s) to solve various problems CO3: **develop** the solution of any problem using non linear data structure(s) CO4: **create** a solution of any problem using searching and sorting techniques CO5: **Design** a hash function using any programming language CO6: **Choose** the most appropriate data structure(s) for a given problem	
7	Course Description	This course starts with an introduction to data structures with its classification, efficiency of different algorithms, array and pointer based implementations and Recursive applications. As the course progresses the study of Linear and Non-Linear data structures are studied in details. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	**CO1**
		Program to implement Operation on Array such as Traversing, Insertion & Deletion operation	**CO1**
		Program based on Recursion such as Towers of Hanoi, Fibonacci series etc.	CO1
	Unit 2	**Linked List**	**CO2**
		Program to implement different operation on the following linked list: Singly, Doubly and circular linked list.	CO2

	Unit 3	**Stack & Queue**			**CO3**
		Program to Implement Stack operation using Array and Linked list			**CO3**
		Program to convert infix expression to post fix expression			**CO3**
		Program on Evaluation of Post fix expression			**CO3**
		Program to implement queue operation using array and linked list			**CO3**
		Program to implement circular queue and deque.			**CO3**
	Unit 4	**Tree & Graph**			**CO4, CO6**
		Program to implement binary tree and BST.			**CO4, CO6**
		Program to implement MST and shortest path algorithm.			CO4, CO6
	Unit 5	**Searching, Sorting & Hashing**			**CO5**
		Program on Searching and Hashing			**CO5**
		Program on Sorting.			CO5
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH			
	Other References	1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI 2. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication 3. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill 4. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH			

PO and PSO mapping with level of strength for Course Name Data Structures (Course Code CSE 242)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	**2**	**2**	**3**	**_**	**_**	**-**	**_**	**_**	**3**	**_**	**_**	**2**	**3**	**2**	**2**
CO2	**3**	**2**	**2**	**2**	**2**	**-**	**_**	**_**	**2**	**_**	**-**	**_**	**2**	**3**	**3**
CO3	**3**	**1**	**3**	**3**	**_**	**_**	**_**	**_**	**3**	**_**	**_**	**1**	**3**	**2**	**2**
CO4	**3**	**2**	**3**	**2**	**_**	**_**	**_**	**_**	**2**	**_**	**_**	**2**	**2**	**3**	**2**

CO5	**2**	**2**	**2**	**_**	**_**	**_**	**_**	**_**	**_**	**_**	**_**	**_**	**1**	**2**	**2**
CO6	**3**	**3**	**2**	**3**	**-**	**-**	**_**	**_**	**3**	**_**	**-**	**_**	**2**	**3**	**2**

Average of non-zeros entry in following table (should be auto calculated).

Course Code	**Course Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO1**	**PSO2**	**PSO3**
CSP 242	**Data structures Lab**	2.67	2	2.5	2.5	2	-	-	-	2.6	-	-	1.7	2.17	2.5	2.2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester: II**	
1	Course Code	PHY 162	
2	Course Title	Physics Lab 2	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.	
6	Course Outcomes	On successful completion of the course the students will have: CO1: Knowledge and study of basic physics experiments based on Semiconductors, energy band gap, planck constant etc. CO2: Use the concept of electricity and magnetism to find out variation of magnetic field through a current carrying coil and hall effect CO3: Understand and learn how to determine specific resistance CO4: Understand and perform laser-based experiments. CO5: Knowledge and study of various optical experiments. CO6: Apply the mathematical concepts/equations to obtain quantitative results and ability to conduct, analyze and interpret experiments	
7	Outline Syllabus		CO Mapping
	Unit 1		
	A B C	1. To determine Energy band gap of a semiconductor using Four Probe method. 2. To determine the variation of magnetic field along the axis of a current carrying coil and estimate the radius of the coil. 3. To study Hall effect and determine the Hall coefficient, carrier density and the mobility of a semiconductor material	CO1 CO2,CO6
	Unit 2		
	A B C	4. To draw hysteresis curve (B-H curve) of a specimen in the form of a transformer on a C.R.O. And to determine its hysteresis loss 5. To determine the Planck's constant by measuring radiation in a fixed spectral range. 6. To determine the specific resistance of the material of a given wire using Carey Foster's bridge.	CO2,CO6
	Unit3		
	A B C	7. To determine the diameter of thin wire by diffraction using laser. 8. To determine the wavelength of laser light by diffraction at a single slit. 9. To determine slit width of single and double slit by using Laser.	CO3,CO6 CO4,CO6

	Unit 4		
	A B C	10. To determine the wavelength of prominent lines of mercury by plane diffraction grating. 11. To determine the wavelength of monochromatic light by Newton's Ring method.	CO4,CO6
	Unit 5		
	A B C	12. To determine the focal length of the combination of two lenses separated by a distance with the help of a nodal slide and to verify the formula. 13. To verify Stefan's Law.	CO5,CO6 CO5,CO6
	Mode of Examination	Lab	
	Weightage Distribution	CA: 30%	CE: 30% / ESE: 40%
	Text books	1. B.Sc. Practical Physics- Harnam Singh, S. Chand Publishing. 2. B.Sc. Practical Physics- C L Arora, S. Chand Publishing.	
	Other References	1. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co. 2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New	

CO –PO MAPPING

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1
CO162.1	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.2	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.3	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.4	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.5	2	2	2	1	1	1	2	3	3	3	2	3	2
CO162.6	2	2	2	1	1	1	2	3	3	3	2	3	2

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: II**	
1	Course Code	EEP112	
2	Course Title	Principles of Electrical and Electronics Engineering Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipments used in engineering applications.	
6	Course Outcomes	CO1:To analyze and solve basic electrical circuits C02: To understand the working principle of transformer and identify its applications. C03: To understand the working principle of dc and ac motors and identify the starting methods of single phase induction motor CO4: Basic of semiconductor diodes working principle and rectifiers CO5: Operational principles of Bipolar and Unipolar devices CO6: Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks.	
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on DC & AC Circuits**	CO1
		To configure a dc circuit on breadboard, and measure voltage/current across/through each element	CO1
		To verify Kirchhoff's Laws	CO1
		To verify Superposition Theorem	CO1
		To find the real power, reactive power, apparent power and power factor of RL & RC load	CO1
	Unit 2	**Practical related to Transformers**	
		To find the efficiency of transformer by obtaining its losses.	CO2
	Unit 3	**Practical related to Electrical Motors**	
		To study cut-section of DC motor and induction motor.	CO3
		To start the DC motor and reverse its direction of rotation.	CO3
		To start an induction motor and reverse its direction of rotation.	CO3
	Unit 4	**Practical related to Diode and Rectifier**	

		To determine voltage-current characteristic of diode			CO4
		To assemble and test half wave and full wave rectifier circuits for their input and output waveform			CO4
	Unit 5	**Practical related to Transistors**			
		To determine input and output characteristics of BJT			CO5
		Validation of BJT as a switch			CO5
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010. 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Publication. 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" Pearson Education, 2009			
	Other References	1. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.			

Course Articulation Matrix:

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO112.1	3	3	3	1	1	-	-	-	-	-	-	-	2	-	-	-
CO112.2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO112.3	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO112.4	2	1	3	-	-	-	-	-	-	-	-	-	2	-	-	-
CO112.5	2	1	1	-	-	-	-	-	-	-	-	-	2	-	-	-

TERM III

School:SET		Batch : 2024-2028	
Program: B.Tech		Current Academic Year: 2024	
Branch:CSE		Semester:III	
1	Course Code	CSE245	
2	Course Title	Discrete Structures	
3	Credits	4	
4	Contact Hours(L-T-P)	3-1-0	
	Course Status		
5	Course Objective	This course provides a mathematical foundation for subsequent study in Computer Science, as well as developing the skills necessary to solve practical problems.	
6	Course Outcomes (CO)	After the completion of this course, students will be able to: CO-1. ***Apply the*** basic principles of sets and operations in sets**.** CO-2. ***Classify*** logical notation and determine if the argument is or is not valid. CO-3. ***Construct*** and prove models by using algebraic structures. CO-4. ***Analyze*** basic principles of Boolean algebra with mathematical description. CO-5. ***Construct*** Permutations and combinations in counting techniques and applications of Graph Theory. CO-6. ***Compose*** computer programs in a formal mathematical manner.	
7	**Prerequisite**	Concepts of algebra	
8	**Course Contents**		CO-Mapping
	Unit 1	**Introduction to Set Theory, Relations and Functions.**	
	A	Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set Identities.	CO1
	B	Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.	CO1
	C	Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.	CO1
	Unit 2	**Logics and Mathematical Induction**	
	A	Propositional Logic: Proposition, well-formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference, Natural Deduction.	CO1,CO2
	B	Predicate Logic: First order predicate, well-formed formula of predicate, quantifiers, Inference theory of predicate logic.	CO1,CO2
	C	Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases.	CO1,CO2
	Unit 3	**Algebraic Structures**	
	A	Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups,	CO3
	B	Homomorphism's, Definition and elementary properties of Rings and Fields, Integers Modulo n.	CO3
	C	Partial order sets: Definition, Partial order sets,	CO3

		Combination of partial order sets, Hasse diagram.	
	Unit 4	**Lattices and Applications**	
	A	Definition, Properties of lattices – Bounded, Complemented, Modular and Complete Lattice, Morphisms of lattices.	CO4
	B	Boolean Algebra: Introduction, Axioms and Theorems of Boolean algebra, Algebraic manipulation of Boolean expressions. Simplification of Boolean Functions, Karnaugh maps, Logic gates, Digital circuits and Boolean algebra. Combinational and sequential Circuits.	CO4
	C	Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.	CO4
	Unit 5	**Graph Theory and Applications.**	
	A	Trees: Definition, Binary tree, Binary tree traversal, Binary search tree.	CO4,CO5
	B	Graphs: Definition and terminology, Representation of graphs, Multi graphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph colouring.	CO4,CO5
	C	Combinatory: Introduction, Counting Techniques, Pigeonhole Principle	CO4,CO5
	Mode of examination	Theory	
	Weightage Distribution	CA	ESE
		25%	75%
	Text book*	1) *1. C. L. Liu, Elements of Discrete Mathematics, second edition 1985, McGraw-Hill Book Company. Reprinted 2000.* 2) Jean Paul Trembley, R Manohar, "Discrete Mathematical Structures with Application to Computer Science", McGraw-Hill. 3) *K. H. Rosen, Discrete Mathematics and applications, fifth edition 2003, Tata McGraw Hill Publishing Company.*	
	other references	1) *J .L. Mott, A. Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.* 2) *W.K. Grassmann and J.P.Trembnlay, Logic and Discrete Mathematics, A Computer Science*	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:** ***Apply the*** basic principles of sets and operations in sets**.**	**PO1,PO2,PO3,PO4,PO6,PO12, PSO1,PSO2**
2.	**CO2:** ***Classify*** logical notation and determine if the argument is or is not valid.	**PO1,PO2,PO3,PO6,PO9,PO12 PSO1,PSO2**
3.	**CO3:** ***Construct*** and prove models by using algebraic structures.	**PO1,PO2,PO3,PO4,PO5,PO9,PSO2 PSO3**
4.	**CO4:** ***Analyze*** basic principles of Boolean algebra with mathematical description.	**PO1,PO2,PO3,PO4,PO5,PO11,PO12 PSO1, PSO3**
5.	**CO5:** ***Construct*** Permutations and combinations in counting techniques and applications of Graph Theory.	**PO1,PO2,PO3,PO4,PO6,PO9,PO11,PO12, PSO2,PSO3**
6	**CO6:** ***Compose*** computer programs in a formal mathematical manner.	**PO1,PO2,PO3, PO4, PO5,PO9,PO11, PSO1,PSO2,PSO3**

PO and PSO mapping with level of strength for Course Name Discrete Structures (Course Code CSE245)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1	2	3	3	1	_	3	_	_	3	_	_	3	3	3	_
CO2	2	2	3	_	_	2	_	_	_	_	_	3	3	2	_
CO3	3	2	3	3	3	_	_	_	2	_	_	_	_	3	2
CO4	2	2	3	3	3	_	_	_	_	_	3	3	3	_	3
CO5	2	2	2	3	_	3	_	_	3	_	3	3	_	2	3
CO6	1	2	1	2	3	_	_	_	3	_	3	_	3	3	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE245	DS	2	2.1	2.5	2	1.5	1.3	0	0	1.8	0	1.8	2	2	2.1	1.6

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***

3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: CSE/IT		**Semester: III**	
1	Course Code	CSE247	
2	Course Title	Computer Organization and Architecture	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	To impart an understanding of the internal organization and operations of a computer and to introduce the concepts of processor logic design and control logic design.	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: **CO1:** Identify the basic structure and functional units of a digital computer CO2:Study the architecture of Bus and registers . **CO3:**Study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations **CO4:**Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes **CO5:**Study the two types of control unit techniques **CO6:** Describe hierarchical memory systems including cache memories and select appropriate interfacing standards for I/O devices.	
7	Course Description	This course discusses the basic structure of a digital computer and used for understanding the organization of various units such as control unit, Arithmetic and Logical unit and Memory unit and I/O unit in a digital computer.	
8	Outline syllabus		CO Mapping
	Unit 1	**Computer Organization and Design**	
	A	Functional units of digital system and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register bus and memory transfer	CO1
	B	Register transfer Language, Registertransfer, Bus & memory transfer, Logic micro operations, Shift micro operation.	CO1
	C	Adder-Subtractor- Incrementor, Arithmetic unit, Logic unit.	CO1
	Unit 2	**Computer Arithmetic**	
	A	Representation of numbers in 1's and 2's complement, Addition and subtractionofs i g n e d numbers.	CO1, CO2
	B	Binary Multiplier, Multiplication: Signed operand multiplication, Booth algorithm	CO1, CO2
	C	Floating point arithmetic representation: addition and subtraction.	CO1, CO2
	Unit 3	**Processor Organization**	
	A	General register organization, stack organization	CO3
	B	Instruction set architecture of a CPU - registers, Instruction types, formats, instruction execution cycle	CO3
	C	Addressing modes, RISC/CISC	CO3
	Unit 4	**Control Unit**	

	A	Introduction to CPU design, Instruction interpretation and execution, Micro-operation and their register transfer language (RTL) specification		CO3, CO4
	B	Hardwired control CPU design		CO3, CO4
	C	Microprogrammed control CPU design		CO3, CO4
	Unit 5	**Memory and I/O**		
	A	RAM/ROM/Flash memory, Designing Memory System using RAM and ROM chips		CO1, CO5
	B	Cache memory: Memory hierarchy, performance Considerations, mapping techniques		CO1, CO5
	C	Input Output: Isolated vs. Memory mapped I/O, Programmed I/O, Interrupt driven I/O, Direct Memory Access		CO1, CO5
	Mode of examination	Theory		
	Weightage Distribution	CE	ESE	
		25%	75%	
	Text book/s*	1. M. Morris Mano, Computer System Architecture, Pearson		
	Other References	1. C. Hamacher, Z. Vranesic and S. Zaky, "Computer Organization", McGrawHill, 2002. 2. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002. 3. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann,1998. 4. J.P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. Identify the basic structure and functional units of a digital computer.	PO1, PO2, PO3, PO6, PO12, PSO3
2.	CO2:Study the architecture of Bus and registers	PO1, PO2, PO3, PO6, PO12, PSO3
3.	CO3. Study the design of arithmetic and logic unit and implementation of fixedpoint and floating-point arithmetic operations	PO1, PO2, PO3, PO6, PO12, PSO3
4.	CO4. Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes	PO1, PO2, PO3, PO6, PO12, PSO3
5.	CO5. Study the two types of control unit techniques	PO1, PO2, PO3, PO4, PO6, PO12, PSO2, PSO3
6.	CO6. Describe hierarchical memory systems including cache memories and select appropriate interfacing standards for I/O devices	PO1, PO2, PO3, PO6, PO12, PSO2, PSO3

PO and PSO mapping with level of strength for Course Name Computer Organization and Architecture **(Course Code CSE 247)**

	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE247	CO1	3	1	1	-	-	2	-	-	-	-	-	2	-	1	3
	CO2	3	3	3	-	-	3	-	-	-	-	-	3	-	2	3
	CO3	3	2	3	-	-	2	-	-	-	-	-	3	-	2	3
	CO4	3	2	2	-	-	1	-	-	-	-	-	3	-	3	2
	CO5	3	3	3	-	-	2	-	-	-	-	-	3	-	2	2
	CO6	3	3	3	-	-	2	-	-	-	-	-	3	-	1	2

1-Slight (Low) **2-Moderate (Medium)** **3-Substantial (High)**

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester: III**	
Branch:			
1	Course Code	CSE253	
2	Course Title	Object Oriented Programming Using Java	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Core /Elective/Open Elective	
5	Course Objective	To learn Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism and multithreading.	
6	Course Outcomes	CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem. CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance. CO4: Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling. CO5. Explain the concept of multithreading. CO6. Design real life application using Java	
7	Course Description	Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Object Oriented Paradigm**	
	A	Introduction to OOP, Characteristics of OOP, Difference between OOP and procedural languages	CO1, CO2
	B	Byte Code, Architecture of JVM	CO1, CO2
	C	Features of Java, Class Loader Execution Engine, Garbage collection.	CO1, CO2
	Unit 2	**Introduction to Java**	
	A	Classes, Objects ,Constructors, Methods	CO1,CO2
	B	Constants, Variables, Data Types, Operators, Expressions, Decision Making Branching, Loops	CO1, CO2
	C	Arrays	CO1, CO2
	Unit 3	**Polymorphism & String handling**	
	A	Polymorphism, method overloading	CO3
	B	Constructors overloading , Wrapper class ,Type conversion & casting,	CO3
	C	Strings and String handling,	CO3
	Unit 4	**Inheritance**	
	A	Inheritance, Types of inheritance, Overriding methods, use of this and super	CO3,CO6

	B	Constructor call in inheritance, Abstract class , Concept of multiple inheritance in Java		CO3,CO6
	C	Final class, method and variable, Interface, Access Modifiers		CO3,CO6
	Unit 5	**Exception and Multithreading**		
	A	Introduction to Exception Handling, Introduction to try, catch, Finally , throw and throws		CO4,CO6
	B	Checked and Unchecked exceptions, User define exception		CO4,CO6
	C	Introduction to Multithreading, Creating thread using Runnable interface and Thread class, Thread life cycle		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1.Schildt H, "The Complete Reference JAVA2", TMH		
	Other References	1. Balagurusamy E, "Programming in JAVA", TMH 2. Professional Java Programming: BrettSpell, WROX Publication		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem.	PO5,PO12
2.	Illustrate different features of java.	PO5
3.	Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance.	PO1,PO2,PO3,PO5,PO9,PO12,PSO1,PSO2
4.	Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling and File I/O	PO5
5.	Explain the concept of multithreading.	PO5
6.	Design real life application using Java.	PO1,PO2,PO3,PO5,PO6,PO7,PO9,PO11,PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Object Oriented Programming Using Java **(Course Code CSE243)**

Course Code_ Course Name	**CO's**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSE253_ Object Oriented Programming Using Java	**CO1**					**2**							**2**			
	CO2					**2**										
	CO3	**2**	**3**	**3**		**2**				**3**			**2**	**2**	**3**	

	CO4					**2**										
	CO5					**2**										
	CO6	**3**	**3**	**3**		**2**	**3**	**2**		**3**		**2**	**3**	**3**	**3**	**2**

Average of non-zeros entry in following table (should be auto calculated).

Course Code	**Course Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSE 253	**Object Oriented Programming Using Java**	**2.5**	**3**	**3**	**0**	**2**	**3**	**2**	**0**	**3**	**0**	**2**	**2.3**	**2.5**	**3**	**2**

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester: III**	
1	Course Code	**CSE 254**	
2	Course Title	Principles of Operating System	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Core	
5	Course Objective	1. This course introduces the challenges for designing the operating systems. 2. Includes different design principles and algorithms. 3. Evaluation of algorithms proposed. 4. Implementation of algorithms and utilities.	
6	Course Outcomes	Students will be able : **CO1:** To Understand the basic concept of Operating system. **CO2:**Explore process management concepts including scheduling, synchronization, deadlocks **CO3:** To understand and implement algorithms in resource allocation and utilization. **CO4:** To integrate and interpret effectiveness, efficiency of algorithms used for resource management of operating systems. **CO5:** Analyze various memory management and virtual memory techniques **CO6:** To Understand file and disk management and analyzing them	
7	Course Description	This course introduces the design principles of operating systems, resource management, identifying challenges and applying respective algorithms.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Operating System Concepts and functions, Comparison of different Operating system	CO1
	B	Types of Operating Systems (Batch, Multiprogramming ,Multi-Tasking , Multiprocessing, Distributed and Real Time Operating System)	CO1
	C	Operating System Structure(Monolithic, Layered and Microkernel), Operating System Services	CO1
	Unit 2	**Process Synchronization**	
	A	Process Concepts (PCB, Process States , Process Operations, Inter process communication)	CO1, CO2
	B	Critical Section problem & their solutions, Introduction to Semaphores	CO1, CO2
	C	Classical Problems of Synchronization(Producer Consumer Problem, Readers Writer Problem, Dining philosophers problem)	CO1, CO2
	Unit 3	**CPU Scheduling**	
	A	Concept , Types of schedulers(Short term, Long term, Middle term), Dispatcher, Performance Criteria	CO1,CO2
	B	CPU Scheduling Algorithms(FCFS, SJF, Priority, Round Robin, Multilevel Queue, Multilevel feedback Queue)	CO1,CO2,CO3,CO4

	C	Deadlock concepts & Handling Techniques(Avoidance, Prevention and Detection & Recovery)		CO1,CO2,CO3,CO4
	Unit 4	**Memory Management**		
	A	Memory Hierarchy, Memory Management Unit		CO1,CO2,CO3,CO5
	B	Paging, Segmentation		CO1,CO2,CO3,CO5
	C	Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU)		CO1,CO2,CO3,CO5
	Unit 5	**INPUT-OUTPUT Management**		
	A	Input –Output interface, Modes of data transfer(Programmed, interrupt and DMA)		CO1,CO2,CO3,CO6
	B	Disk structure , Disk scheduling(FCFS,SSTF, SCAN, LOOK,C-SCAN, C-LOOK)		CO1,CO2,CO3,CO4,CO6
	C	File Concept ,File operations, File Directories, Case study of Windows Operating System		CO1,CO2,CO3,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Silberschatz G, *Operating System Concepts*, Wiley		
	Other References	1. W. Stalling, "Operating System", Maxwell Macmillan 2. Tannenbaum A S, *Operating System Design and Implementation*, Prentice Hall India 3. Milenkovic M, *Operating System Concepts*, McGraw Hill		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:** To identify the challenges and apply suitable algorithms for them.	PO1,PO2,PO3,PO4,PSO1
2.	**CO2:** To assess the strengths and weaknesses of the algorithms.	PO1, PO3, PO4, PSO2
3.	**CO3:** To understand and implement algorithms in resource allocation and utilization.	PO1,PO2,PO3,PO4
4.	**CO4:** To integrate and interpret effectiveness, efficiency of algorithms used for resource management of operating systems.	PO9, PO10,PO11, PSO3
5.	**CO5:** Analyze various memory management and virtual memory techniques	PO1,PO2,PO8,PO9,PO10,PSO1
6.	**CO6:** To Understand file and disk management and analyzing them.	PO1,PO2,PO10,PO11,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Principles of Operating System (Course Code CSE 254)

CSE254	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2
	Co5	2	2	3	-	-	-	-	3	3	1	2	-	3	-	-
	CO6	3	2	-	-	-	-	-	-	-	2	3	-	2	2	-

Syllabus: CSE 252, Computer Networks

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester: III**	
1	Course Code	CSE252	
2	Course Title	**Computer Networks**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	Provide students with an overview of networking, insight into the issues, challenges and working at all level of reference models. Also practice on applying protocols in network design.	
6	Course Outcomes	Students will be able to: **CO1:**Demonstrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model. **CO2:**Investigate and explore fundamental issues driving network design including error control. **CO3:** Understand and building the skills of IP addressing, subnetting and routing protocols. **CO4:** Discuss the flow control, elements and protocols of transport layer **CO5:** Describe the connection management and application layer protocols. **CO6:** Outline the basic knowledge of the use of cryptography and network security.	
7	Course Description	To familiarize with the basic taxonomy and terminology of computer networking area.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Introduction to computer networks, applications and uses, classification of Networks based on topologies, geographical distribution and communication techniques	CO1, CO2
	B	**Reference models:** OSI model, TCP/IP model , Overview of Connecting devices (Hub, Repeaters, Switches, Bridges, Routers, Gateways)	CO1, CO2
	C	**Transmission Media:** wired , wireless, Multiplexing techniques-FDM, TDM	CO1, CO2
	Unit 2	**Data Link Layer**	
	A	Functions, Framing, Error Control-Error correction codes(Hamming code),Error Detection codes(Parity Bit, CRC)	CO1, CO2
	B	Flow Control- Stop and Wait Protocol, Sliding window –Go back N and Selective repeat(ARQ)	CO1, CO2
	C	MAC- Sub-layer Protocols: ALOHA, CSMA, CSMA/CD protocols, IEEE Standards 802.3, 802.4,802.5	CO1, CO2
	Unit 3	**Network Layer**	
	A	Design issues , IPV4addressing basics and Header format, CIDR, sub-netting and sub-masking	CO1,CO3
	B	Routing, optimality Principle Routing protocols-, Shortest path, flooding, distance vector routing , link state routing	CO1,CO3
	C	Congestion control-Leaky bucket , Token Bucket, jitter control	CO1,CO3,CO4

	Unit 4	**Transport Layer**		
	A	Need of transport layer with its services, Quality of service, connection oriented and connection less		CO1,CO4
	B	Transmission Control Protocol: Segment structure and header format, TCP Connection Management, Flow Control		CO1,CO4,CO5
	C	TCP congestion control, Internet Congestion Control Algorithm, Overview of User Datagram Protocol (UDP)		CO1,CO4,CO5
	Unit 5	**Application Layer**		
	A	Domain Name System (DNS), HTTP, FTP, SMTP		CO1,CO5
	B	Network Security services, cryptography, Symmetric versus Asymmetric cryptographic algorithms- DES, and RSA		CO1,CO5,CO6
	C	Application of Security in Networks: Digital signature		CO1,CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Tanenbaum, A.S." Computer Networks", 4th Edition, PHI		
	Other References	1. Forouzan, B.., "Communication Networks", TMH, Latest Edition 2. W. Stallings, "Data and Computer Communication" Macmillan Press		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:**Demonstrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model.	PO2,PO11,PO12,PSO2
2.	**CO2:**Investigate and explore fundamental issues driving network design including error control.	PO1,PO3,PO4,PO5,PO11PO12,PSO2
3.	**CO3:** Understand and building the skills of IP addressing, subnetting and routing protocols.	PO1,PO2,PO4,PO6,PSO1,PSO3
4.	**CO4:** Discuss the flow control, elements and protocols of transport layer	PO2,PO3,PSO2,PSO3
5.	**CO5:** Describe the connection management and application layer protocols.	PO1, PO2,PO3, PO4, PSO2
6.	**CO6:** Outline the basic knowledge of the use of cryptography and network security.	PO1, PO2, PO4,PO8 PO11, PSO2

PO and PSO mapping with level of strength for Course Name Computer Networks (Course Code CSE 252)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2	-	-	-	-	-	-	-	-	2	3	-	3	-
CO2	2	-	2	2	3	-	-	-	-	-	2	3		3	-
CO3	3	2	-	2	-	2	-	-	-	-	-	-	2	-	2
CO4	-	2	2	-	-	-	-	-	-	-	-	-	-	2	2
CO5	2	2	2	2	-	-	-	-	-	-	-	-	-	2	-
CO6	2	-	-	2	-	-	-	2	-	-	2	-	-	2	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code/Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
Computer Networks	1.5	1.33	1	1.33	0.5	0.33	-	0.33	-	-	1	1	0.33	2	0.67

Strength of Correlation:1. Addressed to ***Slight (Low=1) extent 2.*** Addressed to ***Moderate (Medium=2) extent 3.*** Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: III**	
1	Course Code	**BTY223**	
2	Course Title	**Introduction to Biology for Engineers**	
3	Credits	2	
4	Contact Hrs (L-T-P)	2-0-0	
	Course Status	**Compulsory**	
5	Course Objective	Students will be introduced to the functions and interactions of biological systems from a quantitative perspective. To provide a foundation in biology with engineering of living systems and to apply various tools of traditional engineering fields. To harness potential of living systems for the benefit of human mankind.	
6	Course Outcomes	After the successful completion of this course students will be able to: CO1 Analyze the fundamentals of living things, their classification, cell structure and biochemical constituents. CO2: Examine the concept of plant, animal and microbial systems and growth in real life situations. CO3: Discuss bout genetics and the immune system. CO4: Inspect the cause, symptoms, diagnosis and treatment of common diseases. CO5: Elaborate the basic knowledge of biological systems in relevant industries CO6: Appraise the potential of living system for the benefit of environment and human kind and ecosystem.	
7	Course Description	Introduction to Biology designed foundation for careers in for basics of biotechnology, or research in all branches of the Engineering sciences.	
8	Outline syllabus		CO Mapping
	Unit 1	**INTRODUCTION TO LIFE PROCESSES & BIOTECHNOLOGY**	
	A	Characteristics of living organisms; Cell theory; structure of Prokaryotic and Eukaryotic Cell	CO1, CO6
	B	Introduction to Biotechnology and its interdisciplinary applications	
	C	Introduction to Bioinformatics and biological databases; and their applications in various fields of science	
	Unit 2	**Biomolecules**	
	A	General classification and important functions of	CO2, CO6

		carbohydrates and lipids		
	B	General classification and important functions of proteins		
	C	General classification and important functions of DNA and RNA		
	Unit 3	**Genetics and Immune system**		
	A	Theories of Evolution		CO3, CO6
	B	Mendel's laws of inheritance; human genome project		
	C	Immune system and Immunity; role of immunity in viral diseases: case studies of COVID-19		
	Unit 4	**Human Diseases; Prevention and Cure**		
	A	Genetic diseases and Infectious diseases and role of biotechnology in cure of these diseases		CO4, CO6
	B	AIDS and Diabetes and role of biotechnology in cure of AIDS and diabetes		
	C	Cancer its causes and role of biotechnology in cure of cancer		
	Unit 5	**UNIT V: Biotechnology and its Industrial applications**		
	A	Genetic Engineering: Applications of Recombinant DNA Technology across various fields: medicine, food, agriculture, diagnostics, therapeutics etc.		CO5, CO6
	B	Application of biotechnology in agriculture and waste management: Bioremediation, Biopesticides, Biofertilizers		
	C	Production of recombinant proteins and vaccines; Bioreactors		
	Mode of examination	**Theory**		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Berger, S. et al. *Introduction to Bioengineering*, 2020 edition Oxford University Press (ISBN: 978-0-19-856515-4)		
	Other References	1. Alberts, B. et al. *Essential Cell Biology*, 2018 Garland Publishing, Inc. (ISBN: 081533480X) 4.		

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	-	-	-	1	3	-	-	3
CO2	3	-	-	1	-	-	-	-	3	-	-	3
CO3	3	3	3	2	3	-	-	-	2	-	-	2
CO4	3	3	3	2	3	-	-	1	-	-	-	2
CO5	3	-	3	1	-	2	2	2	3	-	-	3
CO6	3	3	3	3	3	3	1	2	3	-	-	2
Avg. Wt.	3	1.50	2.00	1.66	1.50	0.83	0.5	1	2.33	0	0	2.50

School: SET		Batch : 2024-2028	
Program: B Tech		Current Academic Year: 2024	
Branch: CSE		Semester: III	
1	Course Code	CSP-252	
2	Course Title	Computer Networks Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory/Elective	
5	Course Objective	The students will be introduced to the basic concepts and fundamentals of computer networks along with the study of individual layers of reference model.	
6	Course Outcomes	Students will be able to: CO1: Explain the basic concepts of computer network. CO2: Illustrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model CO3: Analyse fundamental issues driving network design including error control, IP addressing, access control, flow and congestion control CO4: Compare working of various routing algorithms CO5: Test various network security algorithms CO6: Examine various cryptographic Algorithms	
7	Course Description	To familiarize with the basic taxonomy and terminology of computer networking area.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction	
	A	Study of Data Communication and Networking. Identify five components of Data communication system.	CO1, CO2
	B	Study of computer network topology and OSI model layered architecture.	CO1, CO2
	C	Study of basic networking commands: IPCONFIG, PING / Tracer and Net stat utilities to debug the network issues.	CO1, CO2
	Unit 2	Data Link Layer	
	A	To connect the computers in Local Area Network	CO1, CO2
	B	Write a C program to implement Character Stuffing and Destuffing	CO1, CO2
	C	Write a C program to Error Detection using Cyclic Redundancy Check Algorithms.	CO1, CO2
	Unit 3	Network Layer	
	A	Write a program to generate Hamming code.	CO1,CO3
	B	Write a C program to determine if the IP address is in Class A, B, C, D, or E.	CO1,CO3
	C	Write a C program to translate dotted decimal IP address into 32 bit address.	CO1,CO3,CO4

	Unit 4	Transport Layer			
	A	Write a program for congestion control using Leaky bucket algorithm.			CO1,CO4
	B	Write a Program to simulate Distance vector routing.			CO1,CO4,CO5
	C	Creating a Network topology using CISCO packet tracer software			CO1,CO4,CO5
	Unit 5	Application Layer			
	A	Write a program to implement DES for encryption.			CO1,CO5
	B	Using RSA algorithm encrypts a text data and decrypts the same.			CO1,CO5,CO6
	C	Open Ended Project			CO1,CO5,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Tanenbaum, A.S." Computer Networks", 4th Edition, PHI			
	Other References	1. Forouzan, B.., "Communication Networks", TMH, Latest Edition 2. W. Stallings, "Data and Computer Communication" Macmillan Press			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Explain the basic concepts of computer network.	PO2,PO11,PO12,PSO2
2.	CO2: Illustrate and differentiate working of all layers of the OSI Reference Model and TCP/IP model	PO1,PO3,PO4,PO5,PO11PO12,PSO2
3.	CO3: Analyze fundamental issues driving network design including error control, IP addressing, access control, flow and congestion control	PO1,PO2,PO4,PO6,PSO1,PSO3
4.	CO4: Compare working of various routing algorithms	PO2,PO3,PSO2,PSO3
5.	CO5: Test various network security algorithms	PO1, PO2,PO3, PO4, PSO2
6.	CO6: Examine various cryptographic Algorithms	PO1, PO2, PO4,PO8 PO11, PSO2

PO and PSO mapping with level of strength for Course Name Computer Networks Lab (Course Code CSP252)

Computer Networks Lab (Course Code CSP252)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1		2	-	-	-	-	-	-	-	-	2	3	-	3	-
	CO2	2	-	2	2	3	-	-	-	-	-	2	3		3	-
	CO3	3	2	-	2	-	2	-	-	-	-	-	-	2	-	2
	CO4	-	2	2	-	-	-	-	-	-	-	-	-	-	2	2
	CO5	2	2	2	2	-	-	-	-	-	-	-	-	-	2	-
	CO6	2	-	-	2	-	-	-	2	-	-	2	-	-	2	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code/Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Computer Networks (CSP252)	1.5	1.33	1	1.33	0.5	0.33	-	0.33	-	-	1	1	0.33	2	0.67

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* *2.* Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

School: SET		**Batch : 2024-2028**			
Program: B Tech		**Current Academic Year: 2024**			
Branch:		**Semester: III**			
1	Course Code	CSP243			
2	Course Title	Object Oriented Programming Using Java Lab			
3	Credits	1			
4	Contact Hours (L-T-P)	0-0-2			
	Course Status	Compulsory/Elective			
5	Course Objective	To learn Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism, packages and multithreading.			
6	Course Outcomes	CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem. CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance. CO4:Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling and File I/O CO5. Explain the concept of multithreading. CO6. Design real life application using Java			
7	Course Description	Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed.			
8	Outline syllabus				CO Mapping
	Unit 1	**Introduction to Object Oriented Paradigm**			
		Program related to garbage collection and OOPS			CO1,CO2
	Unit 2	**Introduction to Java**			
		Program to take input from user, decision making and branching			CO1,CO2
	Unit 3	**Polymorphism**			
		Program related to string handling and polymorphism			CO1,CO2
	Unit 4	**Inheritance, package and Interface Inheritance Implementation**			
		Program related to inheritance and interfaces			CO2,CO3,CO6
	Unit 5	**Exception and Multithreading**			
		Program related to exception handling			CO4,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1.Schildt H, “The Complete Reference JAVA2”, TMH			
	Other References	1. Balagurusamy E, “Programming in JAVA”, TMH Professional Java Programming: Brett Spell, WROX			

		Publication	

PO and PSO mapping with level of strength for Course Name Object Oriented Programming Using Java **(Course Code CSP243)**

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSP243_ Object Oriented Programming Using Java Lab	CO1					2							2			
	CO2					2										
	CO3	2	3	3		2				3			2	2	3	
	CO4					2										
	CO5					2										
	CO6	3	3	3		2	3	2		3		2	3	3	3	2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

Syllabus: CSP 244, Principles of Operating System Lab

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: III**	
1	Course Code	**CSP 244**	
2	Course Title	Principles of operating System Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status		
5	Course Objective	Introduces different type operating systems, functions of operating systems, working in a Unix/Linux and Windows system, writing programs on Process management and file management.	
6	Course Outcomes	CO1: Working with single user multi task and multi-user multi-tasking environment. CO2: Identify and use utilities of Windows & Unix operating systems CO3: Use the resources of operating system i.e. process management and file management CO4: Writing programs on Process creation, multiple process creation, process synchronization, CO5: Writing program on basic file operations CO6: Writing program on file buffering.	
7	Course Description	The course is designed to make the students research/industry ready as operating systems are indispensable for the systems used in industries/research organizations. New operating systems for different gadgets are launched in last few years. So the students will get the design principles operating system in this course.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
		Illustration of Different types of operating system: Single user Multi task, Multi user Multi task	CO1
		Basic Windows features & Unix commands.	CO2
	Unit 2	**Processes**	
		Process basics: Creating processes using fork( ), the parent-child processes PID, PPID, process states: creating orphan, zombie processes.	CO2, CO3, CO4
	Unit 3	**Process Synchronization**	
		Creating multiple processes, Process table, use the command ps with –el, Synchronization of processes by using sleep( ) & wait( ), background process,	CO3, CO4

	Unit 4	**Files**			
		Basic file operations, Programs for File operations, sharing data between processes using files.			CO3, CO4,CO5
	Unit 5	**File Buffering**			
		File descriptor table, system file table, file pointer, buffer accessing block wise, use the functions: fopen( ), fread( ), ftell( ), lseek( ), fflush( ) etc.			CO3, CO4,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Sumitabha Das, "Unix Concepts and Applications", Tata McGraw Hill.			
	Other References	1. Unix: The complete Reference, Kenneth Rosen et.al., TMH 2. Unix 'C' Odessey, Meeta Gandhi et.al. BPB			

Course outline
This course introduces the features of GUI i.e. Windows operating system as well as the CUI i.e. the commands used in Unix, so that the students will be familiar with both GUI & CUI environment of operating systems. As the course progresses the students will learn to write programs for process management and file operations. Further the students can implement the algorithms studied in theory by writing programs using the above principles and skills.

Course Evaluation	
Attendance	None
Any other	CA judged on the practical conducted in the lab , weightage may be specified
References	
Text book	1. Sumitabha Das, "Unix Concepts and Applications", Tata McGraw Hill.
Other References	1. Unix: The complete Reference, Kenneth Rosen et.al., TMH 2. Unix 'C' Odessey, Meeta Gandhi et.al. BPB
Software	Windows, Unix / Any Unix family OS i.e. Linux

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Working with single user multi task and multi-user multi-tasking environment.	PO1,PO2,PO3,PO4,PSO1
2.	CO2: Identify and use utilities of Windows & Unix operating systems	PO1, PO3, PO4, PSO2
3.	CO3: Use the resources of operating system i.e. process management and file management	PO1,PO2,PO3,PO4
4.	CO4: Writing programs on Process creation, multiple process creation, process synchronization,	PO9, PO10,PO11, PSO3
5.	CO5: Writing program on basic file operations	PO1,PO2,PO8,PO9,PO10,PSO1
6.	CO6: Writing program on file buffering.	PO1,PO2,PO10,PO11,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Principles of Operating System (Course Code CSP 244)

CSE244	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2
	Co5	2	2	3	-	-	-	-	3	3	1	2	-	3	-	-
	CO6	3	2	-	-	-	-	-	-	-	2	3	-	2	2	-

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: III**	
1	Course Code	**CSP254**	
2	Course Title	Project Based Learning -1	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project 2.To understand the significance of problem and its scope 3.Students will make decisions within a framework	
6	Course Outcomes	Students will be able to: CO1: Identify and formulate problem statement with systematic approach. CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others. CO3: Design the problem solution as per the problem statement framed. CO4: Classify and understand techniques for software verification and validation of project successfully. CO5: Fabricate and implement the solution by using different aspects of programming language. CO6: Develop a glory of the need to engage in life-long learning.	
7	Course Description	In PBL-1, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1, CO2
	Unit 2	Develop a work flow or block diagram for the proposed system / software.	CO2,CO3
	Unit 3	Design algorithms for the proposed problem.	CO3
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO4, CO5, CO6
		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Implementation Detail. Validation Reports. References if any. The presentation, report, work done during the term supported by the documentation, forms the basis of	

		assessment.			
	Mode of examination	Lab			
	Weight age Distribution	CA	CE	ETE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify and formulate problem statement with systematic approach.	PO1, PO2, PO4, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others.	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12 ,PSO3
3.	CO3: Design the problem solution as per the problem statement framed.	PO1, PO2, PO5, PO9, PO10, PO11, PO12, PSO1,PSO2
4.	CO4: Classify and understand techniques for software verification and validation of project successfully.	PO1, PO2, PO6, PO9, PO10, PO11, PO12,PSO2
5.	CO5: Fabricate and implement the solution by using different aspects of programming language.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12 PSO1,PSO2, PSO3
6.	CO6: Develop a glory of the need to engage in life-long learning.	PO1, PO2, PO4, PO9, PO10, PO11, PO12,PSO3

PO and PSO mapping with level of strength for Course Name Project Based Learning -1 (Course Code CSP254)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3			1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	
CO4	3	3	-	-	-	2	-	-	3	3	2	3		2	
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
CO6	3	3	-	3	-	-	-	-	3	3	2	3			1
AvgPO attained	3	2.7	0.34	1.84	0.67	0.67	0.84	0.5	3	3	2	3	1	1.4	0.5

School: SET		**Batch : 2024-2028**		
Program: B Tech		**Current Academic Year: 2024**		
Branch:		**Semester: III**		
1	Course Code	**CSP292**	Course Name: Summer Internship-I	
2	Course Title	Summer Internship-I		
3	Credits	2		
4	Contact Hours (L-T-P)			
	Course Status	Compulsory		
5	Course Objective	This course will expose students to apply theories learned in the classroom and provides current technological developments relevant to the subject area of training. Students will be able to identify the career preferences and professional goals.		
6	Course Outcomes	Students will be able to: CO1: Get familiarize with industry principles and practices. CO2: Identify and analyze an appropriate problem. CO3: Develop teamwork and apply prior acquired knowledge in problem solving. CO4: Demonstrate effective verbal and written communication skills. CO5: Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards. CO6: Identify the career preferences and professional goals.		
7	Course Description	The Internship aims to offer students the opportunity to apply their prior acquired knowledge in problem solving. Students will acquire skills important for time management, discipline, self learning, and effective communication and so on.		
8	Outline syllabus			CO Mapping
	Unit 1	Define objectives and conditions for the internship, ensuring students that it is related to the study path carried out at the University		CO1,CO6
	Unit 2	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.		CO2,CO6,
	Unit 3	The internship work plan is drawn up by developing team work and applies prior acquired knowledge in problem solving.		CO3,CO6,
	Unit 4	Demonstrate and execute Project with the team. Submission of evaluation form and final report completed by the intern.		CO4,CO6
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.		CO5,CO6
	Mode of examination	Theory		
	Weight age Distribution	CA	ESE	
		25%	75%	

	Text book/s* Other References	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Get familiarize with industry principles and practices.	PO1
2.	CO2: Identify and analyze an appropriate problem.	PO2,PO3,PO5,PSO1,PSO2
3.	CO3: Develop teamwork and apply prior acquired knowledge in problem solving.	PO1,PO2, PO3,PO9,PSO1
4.	CO4: Demonstrate effective verbal and written communication skills.	PO10
5.	CO5: Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards.	PO6,PO8
6.	CO6: Identify the career preferences and professional goals.	PO12,PSO1

PO and PSO mapping with level of strength for Course Name Summer Internship-I

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	2	-	2	-	-	-	-	-	-	-	2	2	-
CO3	2	2	3	-	-	-	-	-	3	-	-	-	1	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	2	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-
Avg PO attained	1	0.84	0.84	0	0.34	0.34	0	0.5	0.5	0.5	0	0.34	0.64	0.34	0

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: III**	
1	Course Code	**ARP207**	
2	Course Title	**Logical Skills Building and Soft Skills**	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
5	Course Objective	To enhance holistic development of students and improve their employability skills. To provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To step up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 1st phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	After completion of this course, students will be able to: CO1: Ascertain a competency level through Building Essential Language and Life Skills CO2: Build positive emotional competence in self and learn GOAL Setting and SMART Goals techniques CO3: Apply positive thinking, goal setting and success-focused attitudes, time Management, which would help them in their academic as well as professional career CO4: Acquire satisfactory competency in use of aptitude, logical and analytical reasoning CO5: Develop strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate an ability to apply various quantitative aptitude tools for making business decisions	
7	Course Description	This Level 1 blended training approach equips the students for Industry employment readiness and combines elements of soft skills and numerical abilities to achieve this purpose.	
8	Outline syllabus – ARP 207		
	Unit 1	**BELLS (Building Essential Language and Life Skills)**	**CO Mapping**
	A	*Know Yourself*: Core Competence. A very unique and interactive approach through an engaging questionnaire to ascertain a student's current skill level to design, architect and expose a student to the right syllabus as also	CO1

		to identify the correct TNI/TNA levels of the student.	
	B	Techniques of Self Awareness | Self Esteem & Effectiveness| Building Positive Attitude | Building Emotional Competence	CO1, CO2
	C	Positive Thinking & Attitude Building | Goal Setting and SMART Goals – Milestone Mapping | Enhancing L S R W G and P (Listening Speaking Reading Writing Grammar and Pronunciation) |	CO1, CO2,CO3
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Syllogism | Letter Series | Coding, Decoding , Ranking & Their Comparison Level-1	CO4
	B	Number Puzzles	CO5
	C	Selection Based On Given Conditions	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Number Systems Level 1 | Vedic Maths Level-1	CO6
	B	Percentage ,Ratio & Proportion | Mensuration - Area & Volume |Algebra	CO6
	Unit 4	**Verbal Abilities – 1**	
	A	Reading Comprehension	CO1
	B	Spotting the Errors	CO2
	Unit 5	**Time & Priority Management**	
	A	Steven Covey Time Management Matrix	CO3
	B	Creating Self Time Management Tracker	CO3
	Weightage Distribution	*Class Assignment/Free Speech Exercises / JAM – 60% | Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*	
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand | **Quantum CAT – Arihant Publications** | **Quicker Maths- M. Tyra** | Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*	

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ARP203.1	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.2	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.3	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP203.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP203.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

TERM IV

School: SET		Batch : 2024-2028	
Program: B Tech		Current Academic Year: 2024	
Branch:		Semester: IV	
1	Course Code	HMM305	
2	Course Title	Management for Engineers	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	The objective of this course is to expose the students to understand the basics of Management Foundations. The students will be given a detailed grounding for the theories and cases related to the general management. The aim of the course is to orient the students in theories and practices of Management so as to apply the acquired knowledge in actual business practices. This is a gateway to the real world of management and decision-making.	
6	Course Outcomes	CO1: Define basic principles and concepts related to management in an organization including the functions, different theories of management and roles they play in an organization. CO2: Explain the primary function Planning with its process. Also, how forecasting is done in organizations with various techniques are used. CO3: Use of organizing by studying different types of organization and also using decentralization and span of control in organizations. CO4: Analyse jobs, recruitment process, manpower planning, job rotation, trainings and rewards in various organizations. CO5: Measure motivation and management control concepts to obtain effective controlling in management system in organizations. CO6: Develop proper system in an organization by using all the functions of management.	
7	Course Description	This course gives an overview of engineering management and help to understand the various functions of management used in an organization. The focus of the course is the development of individual skills and team work.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction of Management & Organisation	CO1,CO6
	A	Management-Definition of Management & Organisation	CO1,CO6
	B	Concept, Nature, Scope and Functions of Management, Levels of Management, Management Theories - Taylors principle, Fayol's Principles, Hawthorne Studies, Systems Approach and Contingency Approach to Management.	CO1,CO6
	C	Mintzberg's Managerial Roles, Skills of Manager, Functions of management	CO1,CO6

	Unit 2	Management Planning Process		CO2,CO6
	A	Planning objectives and characteristics.		CO2,CO6
	B	Hierarchies of planning.		CO2, CO6
	C	The concept and techniques of forecasting.		CO2,CO6
	Unit 3	Organizing		C03,C06
	A	Meaning, Importance and Principles		C03,C06
	B	Departmentalization, Span of Control		CO3,CO6
	C	Types of Organization, Authority, Delegation of Authority		CO3,CO6
	Unit 4	Staffing		CO4,C06
	A	Meaning, Job analysis		CO4,C06
	B	Manpower planning, Recruitment, Transfers and Promotions		CO4, CO6
	C	Appraisals, Management Development, Job Rotation, Training, Rewards and Recognition,		CO4, CO6
	Unit 5	Directing & Controlling		CO5,CO6
	A	Motivation, Co-ordination, Communication,		CO5,CO6
	B	Directing and Management Control, Decision Making,		CO5,CO6
	C	Management by objectives (MBO) the concept and relevance. Objectives and Process of Management Control		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Principles & practice of Mgmt., L.M. Prasad		
	Other References	1. Management Today, Burton & Thakur 2. Principles & Practices of Mgmt., C.B. Gupta 3. Understanding Management, Richard L.Daft 4. Management, Stoner, Freemand & Gilbert 5. Essential of Management, Koontz O' Donnel		

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	CSE249	
2	Course Title	**Database Management System**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status		
5	Course Objective	1.Develop the ability to design, 2. Implement and manipulate databases. 3. Introduce students to build data base management systems. 4. Apply DBMS concepts to various examples and real life applications.	
6	Course Outcomes	Students will be able to: **CO1:** Explain the basics concepts of data base. **CO2:** Demonstrate the knowledge of databases to E-R modelling. **CO3:** Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data. **CO4:** Apply normalization techniques to reduce redundancy from the database. **CO5:** To appraise the basic issues of Transaction processing, Serializability& concurrency control **CO6:** Design & develop database for real life problems	
7	Course Description	This course introduces database design and creation using a DBMS product. Emphasis is on, normalization, data integrity, data modeling, and creation of simple tables, queries, reports, and forms. Upon completion, students should be able to design and implement normalized database structures by creating simple database tables, queries, reports, and forms.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Databases:**	
	A	Introduction of DBMS, Characteristic of DBMS, Data Models, Database languages, Database Administrator,	

		Database Users.	
	B	Three Schema architecture of DBMS, Data Models, Hierarchical, Network ,Data independence and database language, DDL, DML, Data Modeling using Entity Relationship Model	CO1,CO2,CO6
	C	Strong Entity, Weak entity, Specialization and generalization, converting ER Model to relational tables.	
	Unit 2	**Relational Database Language and Interfaces:**	
	A	Relational data model concepts ,Concept of keys, Mapping Constraints	CO3
	B	Null Values, Domain Constraints, Referential Integrity Constraints	
	C	Unary Relational Operations: SELECT and PROJECT Relational Algebra Operations from Set Theory ,Binary Relational Operations: JOIN and DIVISION ,SQL.	
	Unit 3	**Normalization in Design of Databases:**	
	A	Functional Dependency, Different anomalies in designing a Database, loss less join decompositions	CO1, CO4, CO6
	B	Normalization : first second and third normal forms, BoyceCodd normal form, dependency preservation,	
	C	multi-valued dependencies , fourth normal forms, Inclusion dependencies,	
	Unit 4	**Transaction Management:**	
	A	Transaction processing system, schedule and recoverability, Testing of serializability,	CO5
	B	Serializability of schedules, conflict & view serializable schedule	
	C	Recovery from transaction failures, deadlock handling.	
	Unit 5	**Concurrency Control**	
	A	Two-Phase Locking Techniques for Concurrency Control , Concurrency Control Based on Timestamp Ordering	

	B	Multiversion Concurrency Control Techniques ,Validation (Optimistic) Concurrency Control Techniques		CO5
	C	Granularity of Data Items and Multiple Granularity Locking		
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Korth , Silberschatz&Sudarshan, Data base Concepts, Tata McGraw-Hill, Latest Edition		
	Other References	1.Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc. 2.Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Third Edition.		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Understand the basics concepts of data base.	PO1, PO6, PO12, PSO1,PSO2
2.	Acquire the knowledge of databases to E-R modelling.	PO1 , PO5 , PO6 ,PO9, PO12, PSO1 PSO2
3.	Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data.	PO1, PO2, PO3, PO5, PO6, PO12 PSO1, PSO2
4	Learn the basic concept of normalization & apply them to reduce redundancy from the database .	PO1, PO2, PO3, PO4, PO6 ,PO8 PO9 ,PO12 , PSO3
5	To appraise the basic issues of Transaction processing ,Serializability& concurrency control	PO1, PO2, PO3, PO5, PO6, PO8 PO12 ,PSO2
6	Design & develop database for real life problems	PO1, PO2, PO3, PO4, PO5, PO6 PO8 ,PO9 ,PO10 ,PO11, PO12 PSO3

PO and PSO mapping with level of strength for Course Name Database Management System (Course Code CSE 249)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	2	-	-	-	-	-	3	3	3	-
CO2	2	-	-	-	3	2	-	-	2	-	-	3	3	3	-
CO3	3	3	3	-	3	2	-	-	-	-	-	2	2	3	-
CO4	3	3	3	3	-	2	-	2	3	-	-	2	-	-	3
CO5	2	3	2	-	2	2	-	2	-	-	-	1	-	3	-
CO6	3	3	3	3	3	3	-	3	3	3	2	3	-	-	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE 249/ DBMS	2.67	3	2.75	3	2.75	2.2	-	2.3	2.7	3	2	2.3	2.6	3	3

Strength of Correlation:1. Addressed to ***Slight (Low=1) extent 2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

Syllabus for Introduction of Entrepreneurship Development (IED001)

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	IED001	
2	Course Title	Introduction of Entrepreneurship Development	
3	Credits	2	
4	Contact Hours (L-T-P)	0-1-2	
	Course Status	**CORE**	
5	Course Objective	Entrepreneurship plays an influential role in the economic growth and development of the country. As the world economy is changing so is the dynamism of the business world. The aim of this course is to instil and kindle the spirit of Entrepreneurship amongst students. The idea of this course is to create "job providers rather than job seekers".	
6	Course Outcomes	**After successfully completion of this course students will be able to:** CO1. To understand how start up entrepreneurship is supportive for enhancing business. CO2. Outline different ways of idea generation as innovator. CO3. Identify & utilize various Government policy for Small Scale Enterprises and its impact on Business. CO4. Analyze various financial schemes available to start up their enterprise. CO5. Assess the importance & significance of institutional support at various levels for determining the entrepreneurial climate. CO6. Develop the art of creativity and innovations in managing the entrepreneurial activities effectively.	
7	**Outline syllabus**		**CO Mapping**
	Unit A	**Introduction to Entrepreneurship**	**CO1**
	Unit A Topic 1	Meaning, Definition and concept of Enterprise, Entrepreneurship and Entrepreneurship Development, Evolution of Entrepreneurship	CO1
	Unit A Topic 2	Theories of Entrepreneurship. Characteristics of Entrepreneurship, Concepts of Intrapreneurship, Entrepreneur v/s Intrapreneur, Entrepreneur Vs. Entrepreneurship, Entrepreneur Vs. Manager	CO1
	Unit A Topic 3	Role of Entrepreneurship in Economic Development, Factors affecting Entrepreneurship, Problems of Entrepreneurship	CO1
	Unit B	**Entrepreneurship Journey as Innovator**	**CO2**
	Unit B Topic 1	Idea generation, Feasibility Study and opportunity assessment	CO2
	Unit B Topic 2	Business Plan: meaning, purpose and elements, Execution of Business Plan	CO2
	Unit B Topic 3	Entrepreneurs as problem solvers, Innovations and Entrepreneurial Ventures – Global and Indian,	CO2, CO6
	Unit C	**Setting Up Small Business Enterprises**	**CO3**
	Unit C Topic 1	Identifying the business Opportunity – Business opportunity in various Sectors – Formalities for setting up a small Business	CO3

		Enterprise			
	Unit C Topic 2	Benefits to Small Scale Enterprises: Tax Holiday, Rehabitation Allowance, Investment Allowance,			CO3
	Unit C Topic 3	Government policy for Small Scale Enterprises: New Small Enterprise Policy 1991, Micro Small & Medium Enterprises Development (MSMED) Act 2006			CO3, CO6
	Unit D	**Role of Government in promoting Entrepreneurship**			**CO4**
	Unit D Topic 1	MSME policy in India, Agencies for Policy Formulation and Implementation: District Industries Centres (DIC), Entrepreneurship Development Institute of India (EDII),			CO4, CO6
	Unit D Topic 2	National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB),			CO4, CO6
	Unit D Topic 3	Financial Support System: long term and short-term financial support, Investment Institutions.			CO4, CO6
	Unit E	**IPM & Institutional support for small businesses in India**			**CO5**
	Unit E Topic 1	Intellectual Property Management, Importance of innovation, patents & trademarks in small businesses,			CO5
	Unit E Topic 2	Introduction to laws relating to IPR in India, Support in areas of entrepreneurship development			CO5
	Unit E Topic 3	Case Studies based on Role of Industry 4.0 in innovations, Case Studies based on IPR & Patents			CO5, CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Udyamita by Dr. MMP. Akhouri and S.P Mishra, By National Institute for Entrepreneurship and Small Business Development (NIESBUD), NSIC-PATC Campus, Okhla 2. Entrepreneurial Development by Dr S S Khanka, S Chand & Company Ltd 3. Entrepreneurship Development & Small Business Enterprises by Poornima M Charantimath, Pearson. 4. Lall & Sahai: Entreprenurship (Excel Books 2 edition) Couger, C- Creativity and Innovation (IPP, 1999) 5. Kakkar D N - Enterpreneurship Development (Wiley Dreamtech)			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. To understand how start up entrepreneurship is supportive for enhancing business.	PO5, PO9, PO11, PO12
2.	CO2. Outline different ways of idea generation as innovator.	PO1, PO2, PO3, PO4, PO5, PO6
3.	CO3. Identify & utilize various Government policy for Small Scale Enterprises and its impact on Business.	PO10, PO11, PO12
4.	CO4. Analyze various financial schemes available to start up their enterprise.	PO10, PO11, PO12
5.	CO5. Assess the importance & significance of institutional support at various levels for determining the entrepreneurial climate.	PO4, PO7, PO12
6.	CO6. Develop the art of creativity and innovations in managing the entrepreneurial activities effectively.	PO2, PO3, PO4, PO5, PO11, PO12

PO and PSO mapping with level of strength for Course Name Introduction of Entrepreneurship Development (Course Code IED001)

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
IED001_ Introduction of Entrepreneurship Development	CO1	-	-	-	-	1	-	-	-	2	-	2	3	-	-	-
	CO2	1	1	2	3	3	3	-	-	-	-	-	-	-	-	-
	CO3	-	-	-	-	-	-	-	-	-	3	2	3	-	-	-
	CO4	-	-	-	-	-	-	-	-	-	1	3	1	-	-	-
	CO5	-	-	-	1	-	-	3	-	-	-	-	2	-	-	-
	CO6	-	1	3	2	1	-	-	-	-	-	1	2	-	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO11	PSO2	PSO3
IED 001	Introduction of Entrepreneurship Development	1	1	2.5	2	1.67	3	3	0	2	2	2	2.2	0	0	0

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

Syllabus: CSE 251, Theory of Computation

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	CSE-251 | Course Name: Theory of Computation	
2	Course Title	Theory of Computation	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status		
5	Course Objective	The goal of this course is to provide students with an understanding of basic concepts in the theory of computation.	
6	Course Outcomes	Students will be able to: **CO1: Formulate** the concept of Automata and related terminology. **CO2: Design** DFA and NDFA and conversion from NDFA to DFA. **CO3: Construct** finite automata without output and with output. **CO4:Implement** regular expression and grammar corresponding to DFA and vice-versa **CO5: Design** Push down Automata from Context Free Language or Grammar and vice-versa. **CO6: Design** Turing Machine for computational problems, Develop a clear understanding of un-decidability.	
7	Course Description	The course introduces some fundamental concepts in automata theory and formal languages including grammar, finite automaton, regular expression, formal language, pushdown automaton, and Turing machine. Not only do they form basic models of computation, they are also the foundation of many branches of computer science, e.g. compilers, software engineering, concurrent systems, etc. The properties of these models will be studied and various rigorous techniques for analyzing and comparing them will be discussed, by using both formalism and examples.	
8	Outline syllabus		CO Mapping
	Unit 1	**Finite Automata**	
	A	Introduction to languages, Kleene closures, Finite Automata (FA), Transition graph, Nondeterministic finite Automata (NFA), Deterministic finite Automata (DFA).	CO1, CO2
	B	Equivalence of NDFA and DFA, Construction of DFA from NFA and optimization of Finite Automata.	CO1, CO2
	C	Applications and Limitation of FA. (FAT tool).	CO1, CO2
	Unit 2	**Regular Expression and Finite Automata**	
	A	Regular Expression, Finite Automata with null move, Regular Expression to Finite Automata.	CO1, CO2,CO4
	B	Arden Theorem, Pumping Lemma for regular expressions.	CO1, CO2,CO4
	C	FA with output: Moore machine, Mealy machine and Equivalence.	CO1, CO2,CO3
	Unit 3	**REGULAR & CONTEXT FREE LANGUAGE**	
	A	Defining grammar, Chomsky hierarchy of Languages and Grammar. Ambiguous to Unambiguous CFG.	CO4
	B	Simplification of CFGs.	CO4
	C	Normal forms for CFGs, Pumping lemma for CFLs.	CO4

	Unit 4	**PUSH DOWN AUTOMATA**		
	A	Description and definition of PDA and Non-Deterministic PDA, Working of PDA.		CO5
	B	Acceptance of a string by PDA with final state and with Null store. Two stack PDA.		CO5
	C	Conversion of PDA into CFG, Conversion of CFG into PDA.		CO5
	Unit 5	**TURING MACHINE**		
	A	Turing machines (TM): Basic model, definition and representation, Language acceptance by TM.		CO6
	B	Turing machine as a computational machine, Halting problem of TM, Universal TM (Visual Turing machine).		CO6
	C	Modifications in TM, Undecidability of Post correspondence problem, Church's Thesis, Godel Numbering.		CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science(Automata, Languages and Computation)", PHI		
	Other References	1.Peter Linz, "Formal Languages and Auomata", Narosa Publishing House 2.Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Narosa Publishing House		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:** Formulate the concept of Automata and related terminology.	PO1,PO2,PO3,PO4,PO5, PO9,PO12,PSO1,PSO2
2.	**CO2:** Design DFA and NDFA and conversion from NDFA to DFA.	PO1, PO3, PO4, PO5, PO9, PO12 PSO2, PSO3
3.	**CO3:** Construct finite automata without output and with output.	PO1,PO2,PO3,PO4, PO9,PSO1,PSO2
4.	**CO4:** Implement regular expression and grammar corresponding to DFA and vice-versa	PO1,PO2,PO3, PO5,PO9, PO12 PSO3
5	**CO5:** Design Push down Automata from Context Free Language or Grammar and vice-versa .	PO1,PO2,PO3,PO4, PO5, PO9, PO12,PSO1,PSO2,PSO3
6	**CO6:** Design Turing Machine for computational problems,Develop a clear understanding of un-decidability.	PO1,PO2,PO3,PO4,PO5PO9, PO12, PSO1, PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Theory of Computation **(Course Code CSE251)**

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	3	3	2	--	--	--	3	--	--	3	3	2	--
CO 2	3	--	3	3	2	--	--	--	2	--	--	2	--	3	2
CO 3	3	3	3	3	--	--	--	--	2	--	--	--	3	2	--
CO 4	2	2	2	--	2	--	--	--	3	--	--	2	--	--	3
CO 5	3	3	3	3	3	--	--	--	--	--	--	3	3	2	2
CO 6	3	2	3	3	3	--	--	--	2	--	--	3	3	3	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE251	TOC	2.8	2.1	2.8	2.5	2	0	0	0	2	0	0	2.1	2	2	1.5

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	CSE 011	
2	Course Title	Mathematical Techniques	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Program Elective-I	
5	Course Objective	The objective of the course is to teach students the mathematical & statistical techniques that provide sound basis for research and application development in Computer Science.	
6	Course Outcomes	By the end of the course, students will be able to: CO1: Identify and analyze computational errors in numerical computation and series approximation. CO2: Make use of various Numerical techniques for interpolation. CO3: Recall probability concepts and statistical terms to apply in various random situations CO4: Identify various distributions for suitable scenario CO5: Make use of various techniques for hypothesis testing CO6: Apply mathematical and statistical methods in their research and application development	
7	Course Description	In this subject, the fundamental concepts and principles of Mathematical & Statistical Techniques together with the challenging issues in Computer Science software development will be introduced. Discussion on various topics related to mathematics and Computer Science will also be conducted.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction, Computational Errors and their Analysis**	
	A	Accuracy of numbers, Errors and a general error formula, Errors in Numerical Computations.	CO1, CO6
	B	Errors in a Series Approximation.	CO1, CO6
	C	Precisions	CO1, CO6
	Unit 2	**Numerical Techniques**	
	A	LU decomposition for systems of linear equations;	CO2, CO6
	B	numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods;	CO2, CO6
	C	Numerical integration by trapezoidal and Simpson's rules.	CO2, CO6
	Unit 3	**Probability**	
	A	Probability: Conditional Probability;	CO3,CO6
	B	Mean, Median, Mode and Standard Deviation;.	CO3,CO6
	C	Random Variables; Distributions;	CO3,CO6
	Unit 4	**Permutation**	
	A	uniform, normal, exponential	CO4,CO6
	B	Poisson, Binomial distribution	CO4,CO6
	C	Permutations; Combinations; Counting; Summation;	CO4,CO6
	Unit 5	**Hypothesis testing**	
	A	Generating functions; recurrence relations;	CO5,CO6
	B	Techniques for statistical quality control,	CO5,CO6

	C	Testing of hypotheses.		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. M. Goyal, "Computer Based Numerical & Statistical Techniques", Infinity Science Press, LLC, MA, USA.		
	Other References	1. Matheus Grasselli and Dimitry Pelinovsky, "Numerical Mathematics", Jones and Bartlet Publishers, USA. 2. Lars Elden, "Mattrix Methods in Data Mining and Pattern Recognition", SIAM (Society for Industrial and Applied Mathematics), USA. 3. Internet as a resource for references.		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Identify and analyze computational errors in numerical computation and series approximation.	PO1, PO2, PSO1
2.	CO2: Make use of various Numerical techniques for interpolation.	PO1, PO2, PO3, PO7, PO10, PO11, PO12, PSO1, PSO2
3.	CO3: Recall probability concepts and statistical terms to apply in various random situations	PO1, PO2, PO3, PO4, PO7, PO10, PO11, PO12, PSO1,PSO2
4.	CO4: Identify various distributions for suitable scenario	PO1, PO2, PO3, PO4, PO5, PO7, PO10, PO11, PO12, PSO1, PSO2
5.	CO5: Make use of various techniques for hypothesis testing	PO1, PO2, PO3, PO4, PO5, PO7, PO10, PO11, PO12, PSO1, PSO2
6.	CO6: Apply mathematical and statistical methods in their research and application development	PO1, PO2, PO3, PO4, PO5, PO7, PO10, PO11, PO12, PSO1, PSO2

PO and PSO mapping with level of strength for Course Name Mathematical techniques (Course Code CSE011)

Course	Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
Mathematical techniques (CSE011)	CO1	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-
	CO2	2	3	1	1	1	-	1	-	-	1	2	1	1	1	-
	CO3	3	1	1	1	-	-	1	-	-	2	1	1	3	1	-
	CO4	2	3	2	1	1	-	1	-	-	1	1	1	2	1	-
	CO5	1	1	1	2	2	-	1	-	-	1	2	1	2	1	-
	CO6	3	1	3	1	2	-	2	-	-	2	2	3	3	1	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE011	**Mathematical techniques**	**2.3**	**1.8**	**1.3**	**1**	**1**	**0**	**1**	**0**	**0**	**1.1**	**1.3**	**1.1**	**2.1**	**.8**	**0**

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

CO, PO and PSO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Design GUI using AWT and Swing	PO1,PO3,PO5,PO12,PSO2,PSO3
2.	Develop software applications using object-oriented design methodology.	PO1,PO2, PO3,PO5, PO12,PSO1,PSO2,PSO3
3.	Create program using JDBC connectivity.	PO1,PO3,PO5, PO12, PSO1,PSO2,PSO3

School:		**School of Engineering & technology**		
Department		**Department of Computer Science & Engineering**		
Program:		B.Tech		
Branch:		**Computer Science & Engineering**		
1	Course Code	CSE015		
2	Course Title	Advanced Java Programming (VS 1.1)		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Elective		
5	Course Objective	The objective of this course is to inculcate among students structured software development practices using an advanced programming approach.		
6	Course Outcomes	On successful completion of this module students will be able to 1. Design Collection Framework with Data structures. 2. Develop software applications using frameworks. 3. Create program using JDBC connectivity. 4. Develop web based program using servlet and JSP 5. Model the concept of MVC architecture. 6. Make use of web development approach to develop real life application		
7	Course Description	It develops advanced Java programming skills that are required to fully utilize the capabilities of this object-oriented, general-purpose programming language. Emphasis is placed on GUI programming, event-driven programming methods, servlets, JSP and struts.		
8	Outline syllabus			CO Mapping
	Unit 1	**Collection Framework**		
	A	Introduction to Collection Framework Interfaces in Collection		**CO1,CO2**
	B	List, Array List and Linked List, Implement Set and Map		**CO1,CO2**
	C	HashMap and LinkedHas Map, hashEquals method		**CO1,CO2**
	Unit 2	**Database Connectivity**		
	A	Introduction to JDBC: JDBC API, java.sql package, JDBC Drivers and Architecture		**CO2,CO3**
	B	Database connectivity Implementation, Creating and Accessing Database: Creating tables, Retrieving values, Inserting records.		**CO2,CO3**
	C	ResultSet, Prepared statement,		**CO2,CO3**
	Unit 3	**Servlets**		
	A	Servlet: Overview and Architecture, Life Cycle, Servlets Interface , Javax.servlet and javax.servlet.http package, Implementing and Deploying Servlets		**CO2,CO4,CO6**
	B	Request Dispatcher, Requests redirection and forwarding,Introduction to JSP		**CO2,CO4,CO6**

	C	Scripting elements, Scriptlet tag, expression tag, declaration tag, Exception Handling		**CO2,CO4,CO6**
	Unit 4	**Hibernate and JPA**		
	A	Introduction to Hibernate and JPA. Use of JPA		**CO2,CO4,CO6**
	B	Model and Entity Class, hbm, cfg and persistence XML		**CO2,CO4,CO6**
	C	Controller class, SessionFactory and EntityManager Factory		**CO2,CO4,CO6**
	Unit 5	**Spring Framework**		
	A	Introduction of spring, dependency injection and Inversion of Control		**CO5**
	B	MVC with Spring , Introduction to Spring Boot		**CO5**
	C	Service Layer, Repositrty with CRUD		**CO5**
	Mode of examination	Theory		
	Weightage Distribution	CA	ETE	
		25%	75%	
	Text book/s*	1. Schildt H, "The Complete Reference JAVA2", TMH 2. Schildt H, "The Complete Reference J2EE", TMH 3. Cătălin Tudose ,Forewords by Dmitry Aleksandrov and Mohamed Taman January 2023 ISBN 9781617299186 616 pages		
	Other References	1. Balagurusamy E, "Programming in JAVA", TMH. 2. Professional Java Programming:BrettSpell,WROX Publication. 3. Internet as a resource for reference		

CO, PO and PSO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Design Collection Framework with Data structures.	PO1,PO3,PO5,PO12,PSO2,PSO3
2.	Develop software applications using frameworks	PO1,PO2, PO3,PO5, PO12,PSO1,PSO2,PSO3
3.	Create program using JDBC connectivity.	PO1,PO3,PO5, PO12, PSO1,PSO2,PSO3
4.	Develop web based program using servlet and JSP	PO1,PO5, PO12, PSO1,PSO2,PSO3
5	Model the concept of MVC architecture.	PO1,PO5, PO12, PSO1,PSO2
6	Make use of web development approach to develop real life application	PO1,PO2, PO3, PO4, PO5, PO9, PO12, PSO1,PSO2,PSO3

CO, PO and PSO Mapping

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	2	-	-	-	-	-	-	2	2	-	2
CO2	2	-	-	-	2	-	-	-	-	-	-	2	2	3	3
CO3	2	-	3	-	2	-	-	-	-	-	-	2	2	3	3
CO4	2	-	-	-	3	-	-	-	-	-	-	2	3	2	3
CO5	2	-	-	-	2	-	-	-	-	-	-	2	3	2	-
CO6	2	2	3	-	3	-	-	-	2	-	-	2	3	2	2

PO and PSO mapping with level of strength for Course Name: Industry oriented Java Technologies

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
		2.1	2	3	-	2.3	-	-	-	2	-	-	2	2.5	2.4	2.6

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	CSE012	
2	Course Title	Introduction to Graph Theory and its Application	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Program Elective-I	
5	Course Objective	The objective of the course is to teach students the basic graph theory concepts and their applications in computer science.	
6	Course Outcomes	After successful completion of the course students will be able to CO1: demonstrate some of the most important notions and types of graph theory and develop their skill in solving basic applications and understanding societal needs. CO2: interpret the fundamentals of graphs and trees and to apply these as computer science applications such as to find a minimal spanning tree for a given weighted graph etc. CO3: Discover the advanced properties and concepts of graphs such as cut-sets and circuits in graphs, planarity of graphs etc in addition to their application in the real-world. CO4: Examine a graph using matrices to communicate their application in the real world. CO5: Develop efficient graph-theoretic algorithms (mathematically) to explore the applications of coloring problems of graph theory. CO6: Relating the concepts to prepare grounds for project work and research interests.	
7	Course Description	This course is to teach students the basic graph theory concepts and their applications in computer science.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction	
	A	Basic terminologies and concepts of Graph Theory, Fundamental types of graphs, Applications in various areas	CO1
	B	Properties of graphs, theorems based on different types of graph and various operations on graphs	CO1,CO2
	C	Special types of graphs (Hamiltonian, Euler), Travelling salesman problem	CO1, CO6
	Unit 2	TREES	
	A	Fundamentals of trees and their types, Binary trees and their properties, importance of binary trees in data structure (searching algorithms)	CO2
	B	fundamental circuits, spanning trees, algorithms to find spanning trees in a weighted graph (Kruskal& Prim)	CO2
	C	Applications: Representation of the algebraic expressions as ordered binary trees, Huffman procedure for construction of an optimal tree for a given set of weights.	CO2, CO6
	Unit 3	CUT SETS	
	A	a cut-set of a connected graph, the fundamental circuit ,Properties of circuits & cut–sets, Concept of connectivity and separability	CO1, CO3
	B	Concept of Planar graphs with introduction to	CO3

		Kuratowski's non-planar graphs, Proof of Euler's formula		
	C	Detection of planarity , geometric duals of graph, thickness & Crossings, network flow		CO3, CO6
	Unit 4	Coloring and Covering		
	A	Concept of proper coloring of vertices of a graph, chromatic number , Chromatic partitioning		CO5, CO6
	B	Chromatic polynomial, finding chromatic polynomial of a given graph		CO5, CO6
	C	Matching, Covering, Five color problem and its proof		CO5, CO6
	Unit 5	Matrix Representation of Graphs& Applications		
	A	Incidence matrix, sub matrices of A(G), circuit matrix, fundamental circuit matrix and Rank of B		CO3, CO4
	B	Cut set matrix , fundamental cut set matrix, path matrix, Adjacency matrix		CO4
	C	Finding Rank of different matrices, Relationship among A_f, B_f, and C_f		CO3, CO4
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Deo, N, *Graphtheory with applications to Engineering and Computer Science*, Prentice Hall India		
	Other References	1. Wilson R J, *Introduction to Graph Theory*, PearsonEducation 2. Harary, F, *Graph Theory*, Narosa 3. Bondy& Murthy, *Graph theory and application*. Addison Wesley		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: : demonstrate some of the most important notions and types of graph theory and develop their skill in solving basic applications understanding societal needs.	PO1, PO2, PO6, PO7, PO10, PO11, PO12, PSO1
2.	CO2: interpret the fundamentals of graphs and trees and to apply these as computer science applications such as to find a minimal spanning tree for a given weighted graph etc.	PO1, PO2, PO3, PO4, PO6, PO7, PO10, PO12, PSO1
3.	CO3: Discover the advanced properties and concepts of graphs such as cut-sets and circuits in graph, planarity of graphs etc in addition to their application in real-world.	PO2, PO4, PO5,PO6, PO10, PO12, PSO2
4.	CO4: Examine a graph using matrices to communicate their application in real world.	PO2, PO4, PO10,PSO1, PSO2,
5.	CO5: Develop efficient graph-theoretic algorithms (mathematically) to explore the applications of coloring problem of graph theory.	PO1, PO2, PO4, PO5, PO6, PO10, PO12, PSO2
6	CO6: Relating the concepts to prepare grounds for project work and research interests.	PO4, PO6,PO12,PO10, PSO2, PSO3.

PO and PSO mapping with level of strength for Course Name: Introduction to Graph Theory and its Application (CSE 012)

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	2	1	2	2	-	-	2	1	2	3	1	-
CO2	3	3	3	2	-	1	1	-	-	1	-	2	3	1	-
CO3	1	3	1	3	2	2	-	-	-	1	-	2	2	2	-
CO4	1	3	1	3	1	1	-	-	-	2	-	1	3	2	-
CO5	2	2	2	3	2	1	-	-	-	1	-	2	1	2	-
Co6	1	1	2	3	1	2	-	-	-	2	-	2	1	2	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	P O 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE012	Introduction to Graph Theory and its Application	1.83	2.83	1.83	2.67	1.17	1.5	0.5	-	-	1.5	0.17	1.83	2.17	1.67	0.33

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* *2.* Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

Syllabus: CSP 249, Database management System Lab

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	CSP249	
2	Course Title	Database Management System Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	• To Develop efficient SQL programs to access Oracle databases • Build database using Data Definition Language Statements • Perform operations using Data Manipulation Language statements like Insert, Update and Delete	
6	Course Outcomes	By the end of this course you will be able to: CO1: Understand the concept of SQL commands in DBMS CO2: Create SQL SELECT statements that retrieve any required data CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete CO4: Manipulate your data to modify and summaries your results for reporting CO5: Apply Grouping Clauses on various tuples & relations of database CO6: Develop project based on various SQL commands.	
7	Course Description	An introduction to the design and creation of relational databases. Create database-level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands-on experience.	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based Data types**	
		Classification SQL, Data types of SQL/Oracle	CO1,CO2
	Unit 2	**Practical based on DDL commands**	
		Create table, Alter table and drop table	CO2,CO3
	Unit 3	**DML commands and Aggregate functions**	
		Introduction about the INSERT, SELECT, UPDATE & DELETE commands.	CO3,CO4
	Unit 4	**Practical based on Grouping Clauses GROUP BY ORDER BY & GROUP BY HAVING**	
		Briefly explain Group by, order by ,having clauses with examples. Aggregate function: sum, avg, count, max, min	CO5

	Unit 5	**Practical based on Sub- queries, JOINS**			
		Related example of Sub- queries, Joins and related examples,Views,Trigger			CO5,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Korth ,Silberschatz& Sudarshan, Data base Concepts, Tata McGraw-Hill			
	Other References	1. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc. 2. *Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition.* 3. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the concept of SQL commands in DBMS.	PO1,PO5, PSO1 ,PSO2
2.	CO2: Create SQL SELECT statements that retrieve any required data.	PO2, PO3, PO4, PO5, PO9,PSO1, ,PSO3
3.	CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete.	PO2, PO3, PO4, PO5, PO9,PSO1, ,PSO3
4.	CO4: Manipulate your data to modify and summaries your results for reporting.	PO2, PO3, PO4, PO5, PO9,PSO1, ,PSO3
5	CO5: Apply Grouping Clauses on various tuples & relations of database	PO2, PO3, PO4, PO5, PO9,PSO1, ,PSO3
6	CO6: Develop project based on various SQL commands.	PO2, PO3, PO4, PO5, PO9, PO12,PSO1, PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Principles of Database Management System lab (Course Code CSP 249)

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	2	-	-	-	-	-	-	-	2	3	2
CO2	-	3	3	3	2	-	-	-	3	-	-	-	2	3	3
CO3	-	2	2	2	2	-	-	-	3	-	-	-	2	2	3
CO4	-	2	2	2	2	-	-	-	3	-	-	-	2	2	3
CO5	-	2	2	2	2	-	-	-	3	-	-	-	2	2	3
CO6	-	2	3	2	3	-	-	-	3	-	-	2	3	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code/ Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO 3
CSP249 / DBMS lab	3	2.2	2.4	2.2	2.2	-	-	-	3	-	-	2	2.2	2.5	2.8

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

.

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: IV**	
1	Course Code	**CSP297**	Course Name: Project Based Learning -2
2	Course Title	Project Based Learning -2	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project 2.To understand the significance of problem and its scope 3.Students will make decisions within a framework	
6	Course Outcomes	Students will be able to: CO1: Identify and formulate problem statement with systematic approach. CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others. CO3: Design the problem solution as per the problem statement framed. CO4: Explain the characteristics, architecture of database approach, describe the components of the project. CO5: Fabricate and implement the solution by using different object oriented concepts like encapsulation, polymorphism etc. CO6: Develop a glory of the need to engage in life-long learning.	
7	Course Description	In PBL-1, the students will learn how to define the problem for developing projects, identifying the skills required for developing the project based on given a set of specifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1, CO2
	Unit 2	Develop a work flow or block diagram for the proposed system / software.	CO2,CO3
	Unit 3	Design algorithms for the proposed problem.	CO3
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. Validate and verify the project modules.	CO4, CO5, CO6
		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Implementation Detail. Validation Reports. References if any.	

		The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.			
	Mode of examination	Practical /Viva			
	Weight age Distribution	CA	CE (Viva)	ESE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify and formulate problem statement with systematic approach.	PO1, PO2, PO4, PO9, PO10, PO11, O12,PSO1,PSO2,PSO3
2.	CO2: Develop teamwork and problem-solving skills, along with the ability to communicate effectively with others.	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12 ,PSO3
3.	CO3: Design the problem solution as per the problem statement framed.	PO1, PO2, PO5, PO9, PO10, PO11, PO12, PSO1,PSO2
4.	CO4: Explain the characteristics, architecture of database approach, describe the components of the project.	PO1, PO2, PO6, PO9, PO10, PO11, PO12,PSO2
5.	CO5: Fabricate and implement the solution by using different object oriented concepts like encapsulation, polymorphism etc.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12 PSO1,PSO2, PSO3
6.	CO6: Develop a glory of the need to engage in life-long learning.	PO1, PO2, PO4, PO9, PO10, PO11, PO12,PSO3

PO and PSO mapping with level of strength for Course Name Project Based Learning -1 (Course Code CSP297)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	-	3	-	-	-	-	3	3	2	3	2	2	1
CO2	3	2	-	3	-	-	2	-	3	3	2	3			1
CO3	3	2	-	-	2	-	-	-	3	3	2	3	2	2	
CO4	3	3	-	-	-	2	-	-	3	3	2	3		2	
CO5	3	3	2	2	2	2	3	3	3	3	2	3	2	2	
CO6	3	3	-	3	-	-	-	-	3	3	2	3			1
Avg PO attainted	3	2.7	0.3	1.8	0.7	0.7	0.8	0.5	3	3	2	3	1	1.3	0.5

School: SET		Batch : 2024-2028
Program: B Tech		Current Academic Year: 2024
Branch:		Semester: IV
1	Course Code	**ARP208**
2	Course Title	**Quantitative and Qualitative Aptitude Skill Building**
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Active
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 2nd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	After completion of this course, students will be able to: CO1: Develop and deliver the effective presentations to interpret the deeper meaning of life. CO2: Improve listening skills so as to understand complex business communication in a variety of global English accents through proper pronunciation CO3: Demonstrate a good understanding of effective business writing and telephone handling Skills CO4: Acquire higher level competency in use of aptitude, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate higher level quantitative aptitude tools for making business decisions
7	Course Description	This course bundle allows students to build vision, mission and strategy statements while exposing them to various models of communication along with MTI reduction and the 2nd level of quant, aptitude and reasoning abilities

8	Outline syllabus – ARP208		CO MAPPING
	Unit 1	**Communicate to Conquer**	
	A	VMOSA (Vision, Mission, Values and Ethics)| Business Communication -Verbal Communication Skills | Barriers in communication | Basics of effective communication – PRIDE & STAR Model	CO1
	B	Different styles of communication & style flexing (Based on the 4 social styles-Analytical, Driving, Expressive, Amiable) | Importance of Listening & practice of Active Listening | The Art of Giving Feedbacks| Feedback Skills | Asking fact finding questions- Probing Skills	CO2
	C	Email Etiquette | Business Writing Skills| Telephone Etiquette Skills (Telephone Handling Skills) | Non Verbal Communication- Kinesthetics, Proxemics, Paralanguage | MTI Reduction Program |	CO3
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Coding Decoding , Ranking & Their Comparison Level-2	CO4
	B	Series, Blood Relations & Number Puzzle	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Number System Level 2	CO5
	B	Vedic Maths Level-2 | Probability | Permutation & Combination	CO6
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest	CO6
	Unit 4	**Verbal Abilities – 2**	
	A	Paragraph Jumbles	CO2
	B	Critical Reasoning	CO2
	Unit 5	**Basics of GD and PI**	
	A	Understanding and Practicing Mock Group Discussions	CO2
	B	Understanding and Practicing Mock Personal Interviewsss	CO2
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*	
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand | **Quantum CAT – Arihant Publications** | **Quicker Maths- M. Tyra** | Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*	

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ARP204.1	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP204.2	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP204.3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP204.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP204.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP204.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

School: SET		**Batch : 2024-2028**			
Program: B Tech		**Current Academic Year: 2024**			
Branch:		**Semester: IV**			
1	Course Code	CSP014			
2	Course Title	Advanced Java Programming Lab			
3	Credits	1			
4	Contact Hours (L-T-P)	0-0-2			
	Course Status				
5	Course Objective	Objective of this course is to provide the ability to design console based, GUI based and web based applications. Students will also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications			
6	Course Outcomes	On successful completion of this module students will be able to 1. Design GUI using AWT and Swing. 2. Develop software applications using object-oriented design methodology. 3. Create program using JDBC connectivity. 4. Develop web based program using servlet and JSP 5. Model the concept of MVC architecture. 6. Make use of web development approach to develop real life application			
7	Course Description	It develops advanced Java programming skills that are required to fully utilize the capabilities of this object-oriented, general-purpose programming language. Emphasis is placed on GUI programming, event-driven programming methods, servlets, JSP and struts.			
8	Outline syllabus				CO Mapping
	Unit 1	**GUI Programming**			**CO1,CO2**
		Design of interface using swings, AWT, Event handling			
	Unit 2	**Database Connectivity**			**CO2,CO3**
		JDBC connectivity, Insert data from database and retrieve data from database			
	Unit 3	**Servlets**			**CO2,CO4,CO6**
		Server side programming with Java Servlet , Session handling			
	Unit 4	**Java Server Pages (JSP)**			**CO2,CO4,CO6**
		JSP tags, Exception handling,			
	Unit 5	**Struts Framework**			**CO5**
		Struts HTML Tags, Custom Validators Example			
	Mode of examination	Lab			
	Weightage Distribution	CA	CE(Viva)	ETE	
		30%	30%	40%	
	Text book/s*	1. Schildt H, “The Complete Reference JAVA2”, TMH 2. Schildt H, “The Complete Reference J2EE”, TMH			

		3. Struts 2 in Action, Publisher(s): Manning Publications	
	Other References	1. Balagurusamy E, "Programming in JAVA", TMH. 2. Professional Java Programming:BrettSpell,WROX Publication. 3. Internet as a resource for reference	

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO 11	PO12	PSO 1	PSO 2	PSO 3
CO 1	3	-	3	-	2	-	-	-	-	-	-	2	2	-	2
CO 2	2	-	-	-	2	-	-	-	-	-	-	2	2	3	3
CO 3	2	-	3	-	2	-	-	-	-	-	-	2	2	3	3
CO 4	2	-	-	-	3	-	-	-	-	-	-	2	3	2	3
CO 5	2	-	-	-	2	-	-	-	-	-	-	2	3	2	-
CO 6	2	2	3	-	3	-	-	-	2	-	-	2	3	2	2

PO and PSO mapping with level of strength for Course Name: Industry oriented Java Technologies

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
		2.1	2	3	-	2.3	-	-	-	2	-	-	2	2.5	2.4	2.6

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

TERM V

School: SSCSE		**Batch : 2025-2029**		
Program: B Tech		**Current Academic Year: 2025-26**		
Branch:		**Semester: V**		
Branch:		**Computer Science and Engineering**		
1	Course Code	CSE021		
2	Course Title	Introduction to Cloud Computing		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
	Course Status	Core		
5	Course Objective	This introductory course on Cloud computing will teach both the fundamental concepts of how and why Cloud systems works, as well as Cloud technologies that manifest these concepts.		
6	Course Outcomes	At the end of the course, students will have achieved the following learning objectives. CO1. Define the basics of cloud and recall the computer Science concepts which are helpful in understanding on demand service architecture. CO2. Classify and describe the architecture and taxonomy of parallel and distributed computing, including shared and distributed memory, and data and task parallel computing. CO3. Apply the PAAS and SAAS to manage the workflow and use of cloud in scientific application. CO4. Categorize and Characterize between Infrastructure services, deployment models, and governance in cloud computing. Examine the design of task and data parallel distributed algorithms for Clouds and use them to construct Cloud applications. CO5. Evaluate the importance of cloud using monitoring and management of services for performance improvement of HPC and to follow the Governance and Compliances. CO6. Elaborate the design concept and formulate to build the solution		

		using cloud service providers as AWS, MS Azure, Google Cloud. Demonstrate the use of Map-Reduce, Vertex-Centric and Continuous Dataflow programming models.	
7	Course Description	This course is an introductory course for cloud computing concepts and helps in understanding the core functionalities, algorithms, models and workflows in cloud environment. In this course Students will get demonstrations of real-time cloud services for better exposure and research understanding.	
8	Outline syllabus		CO Mapping
	Unit 1	**FOUNDATIONS**	
	A	**Introduction to compute** Types of Computing, Grid computing, distributed computing, Client-server computing, Three Tier Architecture, use of Sockets and Remote Procedure Call, working of RMI and CORBA, Web services, Web Sockets, Message Queues and Message Brokers.	CO1
	B	**Introduction to Cloud Computing** Cloud Computing definition, Roots of Cloud Computing, Layers and Types of Clouds, Desired Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks	CO1
	C	**Migrating and Integrating into Cloud** Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, Evolution and Challenges of SaaS Paradigm, Integration Scenarios, The Integration Methodologies	CO1
	Unit 2	**ENTERPRISE CLOUD COMPUTING AND IAAS**	
	A	**The Enterprise Cloud Computing Paradigm** Issues for Enterprise Applications on the Cloud, Transition Challenges, Enterprise Cloud Technology and Market Evolution, Business Drivers Toward a Marketplace for Enterprise Cloud Computing, The Cloud Supply Chain	CO1,CO2
	B	**Virtual Machines Provisioning and Migration Services** Introduction to Virtual Machines,The Anatomy of Cloud Infrastructures, VM Provisioning and Manageability, Virtual Machine Migration Services, Management of Virtual	CO1,CO2

		Machines for Cloud Infrastructures,, Distributed Management of Virtual Infrastructures, Scheduling Techniques	
	C	**Enhancing Cloud Computing Environments Using a Cluster as a Service** Introduction and Related Work, RVWS Design, Cluster as a Service: The Logical Design, Secure Distributed Data Storage in Cloud Computing, Cloud Storage, Technologies for Data Security in Cloud Computing	CO1,CO2
	Unit 3	**PLATFORM AND SOFTWARE AS A SERVICE**	
	A	**Aneka and Comet Cloud** Aneka—Integration of Private and Public Clouds, Technologies and Tools for Cloud Computing, Aneka Cloud Platform, Comet Cloud: An Autonomic Cloud Engine, Introduction of Comet Cloud (Architecture, Autonomic Behavior, Applications overview)	CO1,CO3
	B	**Business Solutions and Workflow** Cloud-Based Solutions for Business Applications (Introduction of Enterprises Demand and Cloud Computing, Dynamic ICT Services), Workflow Engine for Clouds, Workflow Management Systems, Architecture of Workflow Management Systems	CO1,CO3, CO6
	C	**Scientific Applications and Map Reduce Model** Scientific Application for Cloud Environments, Classification of Scientific Applications and Services in the Cloud, SAGA-based Scientific Applications, Map Reduce Programming Model, Map Reduce Impacts and Research Directions	CO1,CO3, CO6
	Unit 4	**MONITORING, MANAGEMENT & GOVERNANCE**	
	A	**SLA Management in Cloud Computing** Introduction of typical Use Cases, Model for Federated Cloud Computing, Security Considerations, SLA Management in Cloud Computing: A Service Provider's Perspective, Types of SLA, Life Cycle of SLA, Automated Policy-based Management	CO1,CO4
	B	**Performance Predictions for HPC on Clouds** Introduction and Background of Grid and Cloud, HPC in the Cloud: Performance-related Issues, Game Hosting on Cloud Resources, Building Content Delivery Networks Using Clouds, Resource Cloud Mashups	CO1,CO4

	C	**Security and Governance** Basic Concept of Organizational Readiness, Drivers for Changes: Common Change Management Models, Security and Risk in the Cloud, Cloud Computing and Identity, Content Level Security—Pros and Cons, Legal Issues in Cloud Computing(PCI DSS), Data Privacy and Security Issues	CO1,CO4
	Unit 5	**AWS, MS AZURE AND GOOGLE CLOUD**	
	A	AWS Services:EC2, IAM, S3, Lambda, EBS, CDN, Cloud Watch,	CO1,CO5, CO6
	B	MS Azure Services: Azure VM , SQL Server on Virtual Machines, Azure SQL Database, Azure Active Directory, Azure Backup	CO1,CO5, Co6
	C	Google Cloud: Compute Engine, Migrate for Compute Engine, Cloud Functions, Gsuite Admin,Cloud Lab Balancing ,Cloud Storage	CO1,CO5, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA / ESE	
		25% / 75%	
	Text book/s*	CLOUD COMPUTING Principles and Paradigms, Edited by Raj Kumar Buyya, Jam Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter	
	Other References		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Define the basics of cloud and recall the computer Science concepts which are helpful in understanding on demand service architecture. Classify and describe the architecture and taxonomy of parallel and distributed computing, including shared and distributed memory, and data and task parallel computing.	PO1,PO2,PO3,PO4
2.	Define the basics of cloud and recall the computer	PO1,PO2,PO3,PO4
3.	Apply the PAAS and SAAS to manage the workflow and use of cloud in scientific application.	PO1,PO2,PO3,PO4,PSO2 ,PSO3
4.	Categorize and Characterize between Infrastructure services, deployment models, and governance in cloud computing. Examine the design of task and data parallel distributed algorithms for Clouds and use them to construct Cloud applications.	PO1,PO2,PO3,PO4,PSO2 ,PSO3
5.	Evaluate the importance of cloud using monitoring and management of services for performance improvement of HPC and to follow the Governance and Compliances	PO1,PO2,PO3,PO4,PSO2 ,PSO3
6.	Elaborate the design concept and formulate to build the solution using cloud service providers as AWS, MS Azure, Google Cloud.Demonstrate the use of Map-Reduce, Vertex-Centric and Continuous Dataflow programming models.	PO1,PO2,PO3,PO4,PSO1 ,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Introduction to Cloud Computing **(Course Code CSE021)**

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Introduction to Cloud Computing **(Course Code CSE021)**	**CO1**	2	3	1	2											
	CO2	2	2	2	3											
	CO3	1	3	1	2										2	3
	CO4	3	1	2	2										3	2
	CO5	2	2	3	1										2	2
	CO6	1	3	1	2									2	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
		1.83	2.33	1.66	2									.33	1.66	1.67

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: V**	
Branch:		**Computer Science and Engineering**	
1	Course Code	CSE023	
2	Course Title	Android Application Development	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Core /Elective/Open Elective	
5	Course Objective	1. Basics of Android OS 2. Develop Basic and advance Android Apps	
6	Course Outcomes	CO1: Define anatomy of an android application. CO2: Compare different components of Android Application CO3: Develop various android applications related to layouts and rich uses interactive interfaces. CO4:Analyze essential android programming concept CO5: Access and work with databases under an android operating system. CO6: Develop Basic and advance android app development for android devices.	
7	Course Description	This android development course will help students to Understand the basis of Android Platform and its lifecycle. This will help them to implement simple GUI applications, use built-in components and work with database to store the data.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction and Architecture of Android**	
	A	History of Android, Features of Android, Open Handset Alliance (OHA) , Advantages of Android	CO1
	B	Android Directory Structure, Architecture of Android.	CO1
	C	Structure of Manifest files,	CO1
	Unit 2	**Components of Android**	
	A	Activity, Activity life cycle	CO1,CO2
	B	Services, service life cycle	CO1,CO2
	C	Content Provider, Broadcast receivers	CO1,CO2
	Unit 3	**User Interfaces**	
	A	Layouts-Linear layout, Relative layout, Constraint layout, Table layout	CO3
	B	Input Controls – Text input, Checkboxes, Radio buttons, Button, Spinner, Toggle buttons	CO3

	C	Dialog, date picker, Time picker		CO3
	Unit 4	**Intent & Notification**		
	A	Intents, Intent Filter		CO4, CO6
	B	Implicit intent, Explicit Intent		CO4, CO6
	C	Notification		CO4, CO6
	Unit 5	**Working with SQL Lite**		
	A	Introduction to SQLite database, Steps for connecting application with database.		CO5,CO6
	B	Fetch and update data in database from application,		CO5,CO6
	C	Cursor and content value, opening and closing database		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Anubhav Pradhan and Anil V. Deshpande, Composing Mobile Apps: Learn, Explore, Apply Using Android, 1st Edition, Wiley India.		
	Other References	1. Wei-Meng Lee , Beginning Android 4 Application Development. 2. Neil Smyth ,Android Studio Development essentials-Android 6		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Demonstrate and understanding anatomy of an android application.	PO5,PO9,PO12,PSO3
2.	CO2: Develop various android applications related to layouts and rich uses interactive interfaces.	PO5,PO9,PO12,PSO3
3.	CO3:Apply essential android programming concept	PO3,PO5,PO9,PO12,PSO1,PSO3
4.	CO4: Distinguish and compare different components of Android	PO5,PO9,PO11,PO12,PSO3
5.	CO5: Access and work with databases under an android operating system.	PO3,PO4,PO5,PO7,PO9,PO11,PO12,PSO3
6.	CO6: Develop Basic and advance android app development for android devices	PO1,PO2,PO3,PO4,PO5,PO7,PO9,PO11,PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Android Application Development **(Course Code** CSE023**)**

Course Code_ Course Name	**CO's**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSE023_ Android Application Development	**CO1**					3				2			1			2
	CO2					3				2			1			2
	CO3			2		3				2			1	2		2

	CO4					**3**				**2**		**2**	**1**			**2**
	CO5			**2**	**3**	**3**		**2**		**2**		**2**	**1**			**2**
	CO6	**1**	**2**	**3**	**3**	**3**	**3**	**3**		**3**		**3**	**1**	**3**	**3**	**3**

Average of non-zeros entry in following table (should be auto calculated).

Course Code	**Course Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CSE023	**Android Application Development**	**1**	**2**	**2.3**	**3**	**3**	**3**	**2.5**	**0**	**2.2**	**0**	**2.3**	**1**	**2.5**	**3**	**2.2**

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

2.1 Template A1: Syllabus for Theory Courses

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: V**	
Branch:		**Computer Science and Engineering**	
1	Course Code	CSE354	
2	Course Title	Web Technologies	
3	Credits	3	
4	Contact Hours (L-T-P)	2-0-2	
	Course Status	Core /Elective/Open Elective	
5	Course Objective	The objective of this course is to provide a foundation of technologies and technical skills in web development. Based upon the development of a web, this course provides an insight of computer and networking technologies, and hands on experience in web programming.	
6	Course Outcomes	CO1: Define the basic concept of HTML CO2: Illustrate the basics of PHP CO3:Develop interactive web pages using HTML5 and CSS3 CO4: Design web pages/site having validation on user data access. CO5:Compare relationship of HTML,Javascript and PHP CO6:Develop web site for business and organization or for individual	
7	Course Description	The purpose of this course is to give students the basic understanding of Web pages and technologies to be used for designing web sites.	
8	Outline syllabus		CO Mapping
	Unit 1	**HTML & HTML 5**	
	A	HTML basic tags, various links implementation, image ,image map, table formatting, Lists, form design.	CO1
	B	Page layout design using frame, div and span tag, iframe	CO1
	C	HTML5: New elements, canvas, offline webpage, HTML Media: video, audio	CO1,CO3
	Unit 2	**CSS &CSS3**	
	A	Introduction, syntax, selector: class and id, text formatting, margin, align, pseudo-class, pseudo-element	CO3
	B	Positioning, background formatting, Navigation bar, and image gallery.	CO3
	C	CSS3: Introduction, colors, text formatting, fonts formatting, Background formatting, 2D transform, animation	CO3
	Unit 3	**Java script**	
	A	Introduction, syntax, comment, statement, variable, operators	CO4,CO5

	B	Conditional statements, looping statements, Functions		CO4,CO5
	C	Object, events, Accessing form elements, validating form elements,popup windows.		CO4,CO5
	Unit 4	**PHP Basics**		
	A	Introduction to PHP, syntax, variables, operators		CO2,CO5
	B	Conditional statement, iterative statements,Functions		CO2,CO5
	C	Array: single, multi dimensional, numeric array, associative array		CO2,CO5
	Unit 5	**File Handling in PHP**		
	A	File Operation: Reading & writing data on web page from file, deleting file, renaming file		CO5,CO6
	B	Session Management: introduction, creation, destroying and login session management		CO5,CO6
	C	PHP Database Connectivity, Retrieving records, retrieving fields from record		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Ivan Bayross,"HTML,DHTML, JavaScript, Perl & CGI", BPB Publication 2. Schildt H, "The Complete Reference JAVA2", TMH 3. Schildt H, "The Complete Reference J2EE", TMH		
	Other References	1. Rick Delorme," Programming in HTML5 with JavaScript and CSS3", Microsoft		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	Define the basic concept of HTML	PO5,PSO2
2.	Illustrate the basics of Extensible markup language.	PO5,PSO2,PO12
3.	Develop interactive web pages using HTML5 and CSS3	PO2,PO3,PO5,PO6,PO9, PSO1,PSO2,PSO3
4.	Design web pages/site having validation on user data access.	PO2,PO3,PO5,PO6,PO9, PSO1,PSO2,PSO3
5.	Compare relationship of HTML,Javascript and PHP	PO5,PSO2
6.	Develop web site for business and organization or for individual	PO1, PO2,PO3,PO4,PO5,PO6, PO7,PO9,PO11,PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Web Technologies **(Course Code CSE352)**

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE352_ Web Technologies	CO1					1									1	
	CO2					3							1		1	
	CO3		1	3		2	1			2				1	2	2
	CO4		1	3		1	1			2				1	2	2
	CO5					2									1	
	CO6	2	3	3	1	3	3	1		3		2	2	1	2	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
Cse 352	Web Technologies	2	1.6	2.3	1	2	1.6	1	0	2.2	0	2.3	1.5	1	1.5	2.2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		Batch : 2024-2028	
Program: B Tech		Current Academic Year: 2024	
Branch:		Semester: V	
1	Course Code	CSE356	
2	Course Title	Design and Analysis of Algorithms	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	Objective of this course is to 1. Reinforce basic design concepts (e.g., pseudocode, specifications, top-down design) 2. Knowledge of algorithm design strategies 3. Familiarity with an assortment of important algorithms. 4. Enable students to analyze time and space complexity	
6	Course Outcomes	Students will be able to: **CO1: Analyze** the asymptotic performance of algorithms **CO2**: **Describe** the dynamic-programming and Greedy paradigm and explain when an algorithmic design situation calls for it. **CO3: Demonstrate** a familiarity with major algorithms and data structures **CO4: Apply** important algorithmic design paradigms and methods of analysis **CO5: Discuss** NP-complete problems and develop algorithms to solve the problems. **CO6: Choose** appropriate algorithm design techniques for solving problems.	
7	Course Description	This course introduces concepts related to the design and analysis of algorithms. Specifically, it discusses recurrence relations, and illustrates their role in asymptotic and probabilistic analysis of algorithms. It covers in detail greedy strategies divide and conquer techniques, dynamic programming and max flow - min cut theory for designing algorithms, and illustrates them using a number of well-known problems and applications.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	Introduction : Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements	CO1, CO3
	B	Asymptotic Notations and their properties – Mathematical analysis for Recursive and Non-recursive algorithms, Recurrences relations, Master Method	CO1, CO2, CO3
	C	Divide-and-conquer: Analysis and Structure of divide-and-conquer algorithms, Divide-and-conquer examples-Quick sort, Merge sort, Sorting in Linear Time counting sort, Heap Sort	CO1, CO2, CO4
	Unit 2	**Greedy Method**	
	A	Overview of the Greedy paradigm, Analysis and example: task scheduling,	CO1,CO2,CO3
	B	Fractional Knapsack problem, Single source shortest paths problem: Dijkastra's Algorithm,	CO1,CO2,CO3

		Bellman-ford Algorithm,	
	C	Overview and analysis of Backtracking & Branch and Bound: N-Queens problem and Sum of subsets	CO1,CO2,CO3
	Unit 3	**Dynamic Programming**	
	A	Overview, Difference between dynamic programming and divide and conquer, All pair shortest path problems: Floyd-Warshall Algorithm	CO1,CO2,CO3, CO4
	B	Applications and analysis: Matrix Chain Multiplication,	CO1, CO2, CO3, CO4
	C	Applications and analysis: Longest Common sub-sequence, 0/1 Knapsack Problem	CO1,CO2,CO3
	Unit 4	**Advanced Data Structures**	
	A	Red-Black Trees - Definition, Applications, Insertion and deletion of elements in RB-Tree	CO1, CO2, CO3, CO4
	B	B-Trees - Definitions, Applications, Insertion and Deletion in B-Trees	CO1, CO2, CO4
	C	Data Structure for Disjoint Sets – Definition, Binomial Heaps, Fibonacci Heaps.	CO1, CO2, CO3, CO4
	Unit 5	**Selected Topics**	
	A	Introduction to NP Complete and NP Hard Problems, Examples, Amortized Analysis	CO1,CO2,CO3,
	B	Approximation Algorithms – Travelling Sales Person Problem and Vertex Cover Problem, Randomized Algorithms, Randomized Quick Sort Algorithm	CO1,CO2,CO3
	C	String Matching Algorithms – Naive String Matching Algorithm, Rabin Karp Algorithm.	CO1,CO2,CO3, CO4
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Cormen et al., "Introduction of Computer Algorithms", Prentice Hall India	
	Other References	1. Sahni et al., "Fundamentals of Computer Algorithms", Galgotia Publications. 2. Hopcroft A, The Design And Analysis Computer Algorithms, Addison Wesley	

School: SET		**Batch : 2024-2028**		
Program: B Tech		**Current Academic Year: 2024**		
Branch: CSE		**Semester: V**		
1	Course Code	CSE357	Course Name: Software Engineering and Testing Methodologies	
2	Course Title	Software Engineering and Testing Methodologies		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Core /Elective/Open Elective		
5	Course Objective	The objective of this course is to provide 1. Fundamental knowledge of software engineering 2. To make student aware of best software engineering practices 3. Inculcate ability in students to work as an effective member or leader of software engineering teams 4. To help students to develop skills that will enable them to construct software of high quality		
6	Course Outcomes	CO1: Illustrate and compare an effective software engineering process, based on knowledge of widely used development lifecycle model CO2: Apply effective requirement elicitation techniques to develop SRS for a project. CO3: Construct design documents with the help of designing tools CO4: Analyze testing strategies for a software system CO5: Develop and deliver quality software as an individual or as part of a multidisciplinary team. CO6: Adapt techniques and tools necessary for software engineering practices.		
7	Course Description	This course provides knowledge of software engineering. It introduces concepts such as software processes and agile methods and essential software development activities, from initial specification to system maintenance. Formalisms and tools to assist in software development are also presented, including common design patterns and UML notation. Course focuses on all levels of testing.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction to Software Engineering and Process Models**		
	A	Significance challenges and Software Myths in software engineering, Software Components, Software Characteristics, Software Crisis, software applications		CO1
	B	Software Development Methodologies: Waterfall model, prototyping model, Incremental model, Spiral model, V model, component based, RAD model		CO1
	C	Agility, Agile Process models: Extreme Programming (XP), Adaptive Software Development (ASD), Scrum		CO1
	Unit 2	**Software Requirement Engineering**		
	A	Requirement Elicitation: Interviews, Brainstorming Sessions, Quality Function Deployment.		CO2
	B	Functional & Non Functional Requirements, Known Requirements, Unknown Requirements, Undreamt Requirement.		CO2
	C	Requirement Documentation: Characteristics of SRS, Document SRS according to IEEE standards.		CO2

	Unit 3	**Software Design**	
	A	Design Concepts, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design	CO3, CO6
	B	Effective modular design: Functional independence, Cohesion, Coupling, Design documentation	CO3, CO6
	C	UML Diagrams and Tools: Introduction to UML Diagrams, Use Case , Object and Class, Interaction diagram: Sequence & Collaboration , Introduction to Rational Rose tool	CO3, CO6
	Unit 4	**Software Implementation and Testing**	
	A	Fundamental of testing: Objectives, principles, myths and facts, Error, Mistake, Bug, Fault and Failure, limitations of testing, AWS Testing Tools and Services, Automated AWS testing tools, AWS Third-party QA tools, Do-it-yourself QA in AWS	CO4
	B	Levels of testing: Unit Testing, Integration Testing, System Testing, Acceptance Testing: Alpha & Beta Testing, Integration techniques, Penetration Testing in AWS, Distributed Load Testing on AWS,	CO4, CO6
	C	White Box Testing, Black Box Testing, Verification and Validation, Test case designing, Guidelines for Coding, Debugging	CO4, CO6
	Unit 5	**Maintenance & Quality Management**	
	A	Introduction to Maintenance , Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance	CO5, CO6
	B	Quality Concepts: Quality, Quality Control, Cost of Quality, Software Quality Assurance , SQA Plan , Software Reliability: Measures of Reliability and Availability, Software Safety, Cloud QA Testing on AWS	CO5, CO6
	C	Statistical Software Quality Assurance: Six Sigma, The ISO 9000 Quality Standards, Capability Maturity Model	CO5, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Pressman R S, Software Engineering: A Practitioners Approach, McGraw Hill.	
	Other References	1.Datta S, Software Engineering: Concepts and Applications, Oxford University Press, 2010. 2. K.K. Aggrawal and Yogesh Singh, "Software Engineering", New Age International Publication 3 .Sommerville, Ian. "Software Engineering", Pearson(Latest Ed). Distributed Load Testing on AWS - Implementation Guide (amazon.com)	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Illustrate and compare an effective software engineering process, based on knowledge of widely used development lifecycle model	PO1,PO3,PO8,PO9,PO10,PO 12,PSO1,PSO3
2.	CO2: Apply effective requirement elicitation techniques to develop SRS for a project	PO1,PO2,PO3,PO4,PO5,PO8, PO9,PO10, PO11,PO12,PSO1,PSO3
3.	CO3: Construct design documents with the help of designing tools	PO1,PO2,PO3,PO4,PO5, PO8,PO9,PO10, PO11,PO12,PSO1,PSO3
4.	CO4:Analyze testing strategies for a software system	PO1,PO2,PO4,PO5,PO6,PO7, PO8,PO9,PO10, PO11,PO12,PSO1,PSO3
5.	CO5: Develop and deliver quality software as an individual or as part of a multidisciplinary team.	PO1,PO2,PO3,PO4,PO5, PO6,PO7, PO8,PO9,PO10,PO11,PO12,P SO1,PSO3
6.	CO6: Adapt techniques and tools necessary for software engineering practices .	PO1,PO4,PO5,PO8,PO9,PO1 0,PO11,PSO3

PO and PSO mapping with level of strength for Course Name Software Engineering and Testing Methodologies (Course Code CSE357)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CSE351_ Software Engineering and Testing Methodologies	CO1	3	-	2	-	-	-	-	1	2	3	-	3	1	-	2
	CO2	3	3	2	3	3	-	-	1	2	3	2	3	2	-	3
	CO3	3	2	3	3	3	-	-	1	2	3	1	2	2	-	3
	CO4	3	1	-	1	3	2	2	2	3	3	2	3	1	-	3
	CO5	3	1	3	3	3	3	3	2	3	3	1	3	1	-	3
	CO6	2	-	-	1	3	-	-	1	2	2	2	-	-	-	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 11	PSO 2	PSO 3
CSE351	Software Engineering and Testing Methodologies	2.8	1.75	2.5	2.2	3	2.5	2.5	1.3	2.3	2.8	1.6	2.8	1.4	0	2.8

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**		
Program: B Tech		**Current Academic Year: 2024**		
Branch: CSE		**Semester: V**		
Branch:	**Semester: V**	BRM003		
2	Course Title	Research Methodology		
3	Credits	2		
4	Contact Hours (L-T-P)	0-1-2		
	Course Status	Core		
5	Course Objective	The primary objective of this course is to develop a research orientation among the scholars and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.		
6	Course Outcomes	The student will be able to CO1: Understand the basic framework of research process CO2: Formulate hypotheses or suggested solutions CO3: Categorize various sources of research design, information for literature review and data collection CO4: Discuss the different sampling techniques CO5: Escalate the components of scholarly writing and evaluate its quality CO6: Conduct disciplined research under supervision in an area of their choosing		
7	Course Description	Research Methodology is a hands-on course designed to impart education in the foundational methods and techniques of academic research in social sciences and business management context. Research scholars would examine and be practically exposed to the main components of a research framework i.e., problem definition, research design, data collection, ethical issues in research, report writing, and presentation.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction to Research**		
	A	Meaning of Re-search, Retracing the path, Importance of re-search.		CO1
	B	Philosophies, and the language of research theory building Theoretical background of a research philosophy The meaning of methodology (structured definition and examples)		CO1
	C	Understanding research terminologies i.e., Concepts, Constructs, Variables, and Definitions etc.		CO1
	Unit 2	**Problems and Hypotheses**		
	A	Identifying research problem, State-of-the-Art, The problem definition lifecycle		CO1, CO2
	B	Constructing research hypothesis around the identified problem, Hypothesis classification: Null & Alternative Hypothesis		CO1, CO2
	C	Characteristics of a Good Hypothesis, Testing and Verification of Hypothesis		CO1, CO2
	Unit 3	**Research design**		
	A	Experimental and Non-experimental research design		CO1, CO3

	B	Field research, Survey Research, Survey outcomes			CO1, CO3
	C	Methods of data collection – Secondary data collection methods, qualitative methods of data collection, and Survey methods of data collection			CO1, CO3
	Unit 4	**Sampling Techniques**			
	A	Attitude measurement and scaling – Types of measurement scales; Questionnaire designing – Reliability and Validity			CO1, CO4, CO5
	B	Sampling techniques – The nature of sampling, Probability sampling design			CO1, CO4, CO5
	C	Nonprobability sampling design, Determination of sample size			CO1, CO4, CO5
	Unit 5	**Data Analysis**			
	A	Motivation behind Data Preparation, Need for preparing data, Raw and Processed Data, Components of Tidy Data, Various sources of different Data types			CO1, CO3, CO6
	B	Data attributes, Discrete vs Continuous Data attributes Statistical description of Data- Central Tendency: Mean, Median, Mode; Data dispersion: Range, Quartile, Variance, SD, Interquartile Range			CO1, CO3, CO6
	C	Report generation, report writing, and APA format – Title page, Abstract, Introduction, Methodology, Results, Discussion, References, and Appendices			CO1, CO3, CO6
	Mode of examination	Lab			
	Weightage Distribution	CE	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Bryman, Alan & Bell, Emma (2011). Business Research Methods (Third Edition), Oxford University Press. 2. Kerlinger, F.N., & Lee, H.B. (2000). Foundations of Behavioural Research (Fourth Edition), Harcourt Inc. 3. Rubin, Allen & Babbie, Earl (2009). Essential Research Methods for Social Work, Cengage Learning Inc., USA.			
	Other References	1. Chawla, Deepak & Sondhi, Neena (2011). Research methodology: Concepts and cases, Vikas Publishing House Pvt. Ltd. Delhi. 2. Pawar, B.S. (2009). Theory building for hypothesis specification in organizational studies, Response Books, New Delhi. 3. Neuman, W.L. (2008). Social research methods: Qualitative and quantitative approaches, Pearson Education.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Understand the basic framework of research process	PO1, PO2, PO3, PO6, PO7, PO12, PSO1
2.	CO2: Formulate hypotheses or suggested solutions	PO1, PO2, PO3, PO6, PO7, PO12, PSO1
3.	CO3: Categorize various sources of research design, information for literature review and data collection	PO1, PO2, PO3, PO4, PO6, PO7, PO12, PSO1
4.	CO4: Discuss the different sampling techniques	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, P011, PO12, PSO1, PSO2, PSO3
5.	CO5: Escalate the components of scholarly writing and evaluate its quality	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12, PSO1
6.	CO6: Conduct disciplined research under supervision in an area of their choosing	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12, PSO1

PO and PSO mapping with level of strength for Course Name Research Methodology (Course Code BRM003)

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
BRM003_ Research Methodology	CO1	3	1	1	-	-	2	1	-	-	-	-	3	3	-	-
	CO2	2	2	1	-	-	1	3	-	-	-	-	3	3	-	-
	CO3	3	1	1	2	-	2	1	-	-	-	-	3	3	-	-
	CO4	3	3	3	3	2	2	-	3	3	3	3	3	2	2	3
	CO5	3	3	3	3	3	2	3	-	-	-	-	3	3	-	-
	CO6	2	2	2	2	3	2	3	-	-	-	-	3	3	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO2
BRM 003	Research Methodology	2.7	2.0	1.8	2.5	2.7	1.8	2.2	3.0	3.0	3.0	3.0	3.0	2.8	2.0	3.0

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**
Program: B Tech		**Current Academic Year: 2024**
Branch: CSE		**Semester: V**
1	Course Code	**ARP 305**
2	Course Title	**Personality Development and Decision making Skills**
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Active
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 3rd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	After completion of this course, students will be able to: CO1: Apply skills of personality development which will help a student groom to meet the needed social strata for establishing thelves in the society CO2: Build a positive behavioural attitude and attributes developing interpersonal skills for building positive and meaningful social and professional relationships CO3: Review and revise development plans to adapt to changing aspirations, circumstances and working environments CO4: Acquire higher level competency in use of numbers and digits, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building cubes and cuboids. CO6: Demonstrate higher level quantitative aptitude such as analytical and statistical tools for making business decisions.
7	Course Description	This bundles Training approach attempts to explore the personality, character, and the natural style of the student. This helps to develop character, personality, confidence and interpersonal abilities within the student along with level 3 readiness in quant, aptitude and reasoning skills
8	Outline syllabus – ARP305	

	Unit 1	**Impress to Impact**	**CO MAPPING**
	A	What is Personality?| Creating a positive impression – The 3 V's of Impression | Individual Differences and Personalities	CO1
	B	Personality Development and Transformation | Building Self Confidence | Behavioural and Interpersonal Skills	CO2
	C	Avoiding Arguments | The Art of Assertiveness | Constructive Criticism | The Personal Effectiveness Grid | Assessing our	CO3

		Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model	
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Numbers & Digits , Mathematical Operations | Analytical Reasoning	CO4
	B	Cubes & Cuboids | Statement & Assumptions	CO5
	C	Strong & Weak Argument	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Work & Time ,Pipes & Cistern	CO6
	B	Time ,Speed & Distance, Quadratic & Linear Equations, Logs & Inequalities	CO6
	C	Sequence & Series, Logarithms, Data Interpretation | Data sufficiency - Level 1	CO6
	Unit 4	**Verbal Abilities-3**	
	A	Cloze Test	CO3
	B	Sentence Rearrangement	CO3
	Unit 5	**Charisma Building**	
	A	How to Build Charisma	CO2
	B	Steps Towards Building a Charisma	CO2
	C		
	Weightage Distribution	*(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude – 40%*	
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand* | ***Quantum CAT – Arihant Publications*** | ***Quicker Maths- M. Tyra*** | *Power of Positive Action (English, Paperback, Napoleon Hill)* | *Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon* | *Goal Setting (English, Paperback, Wilson Dobson*	

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
ARP301.1	-	-	-	-	-	1	-	-	1	2	1	2	-	-	-
ARP301.2	-	-	-	-	-	1	-	-	1	2	1	2	-	-	-
ARP301.3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP301.4	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP301.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP301.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch: CSE		**Semester: V**	
1	Course Code	**ECC301**	Course Name: Community Connect
2	Course Title	Community Connect	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-0	
	Course Status	Compulsory	
5	Course Objective	1. The objective of assigning the project related to community work is to expose our students to different social issues faced by the people in different sections of society. 2. This type of project work will help the students to develop better understanding of problems of people living in disadvantage position in the society, may be socially, medically, economically, or otherwise. 3. This type of live project work will help our students to connect their class-room learning with practical issues/problems in the society.	
6	Course Outcomes	Students will be able to: 1. **CO1: Students develop awareness** of the social, health, and environmental challenges faced by the community 2. **C02: Students are more appreciative** of socio-economic realities beyond textbooks and classrooms 3. **CO3: Students learn to apply their knowledge** through research, awareness creation, and services for community benefit 4. **CO4: Students are able to carry** out community-based projects with sincerity, teamwork and timely delivery 5. **CO5: Students learn to respectfully engage** with communities with purposive intent to contribute to society and sustainable development 6. **C06: Students are able to document and present** their community project findings in an academically robust manner	
7	Course Description	In Community Connect projects, students will learn how to identify problems of rural and underprivileged communities by conducting surveys, or will help the communities by providing services or solutions for the issues faced by them.	
8	Outline syllabus		CO Mapping
	Unit 1	Team/Group formation and Project Assignment. Problem Definition & Finalizing the problem statement, Resource requirement, if any.	CO1, CO2
	Unit 2	Develop a useful questionnaire or service to the community that will aid in achieving the objectives of the project.	CO2, CO3. CO4
	Unit 3	Learn how to interact with the community members, whether in survey or service-based project – to help develop a more open mindset in the students.	CO3, CO4, CO5
	Unit 4	Analysis of survey data and/or impact on the community members.	CO3, CO4
	Unit 5	Demonstrate and justify their findings in light of the data they have gathered, or show the benefits to the community of the actions they have taken.	CO4, CO5, CO6

	Mode of examination	Lab			
	Weight age Distribution	CA	CE	ESE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	**CO1: Students develop awareness** of the social, health, and environmental challenges faced by the community	PO2, PO3, PO4, PO6, PO8, PO9, PO10, PO12
2.	**C02: Students are more appreciative** of socio-economic realities beyond textbooks and classrooms	PO1, PO2, PO3, PO4, PO6, PO8, PO9, PO10, PO11, PO12
3.	**CO3: Students learn to apply their knowledge** through research, awareness creation, and services for community benefit	PO1, PO2, PO3, PO4, PO5, PO6, PO9, PO10, PO11, PO12, PSO1, PSO2, PSO3
4.	**CO4: Students are able to carry** out community-based projects with sincerity, teamwork and timely delivery	PO2, PO3, PO6, PO8, PO9, PO10, PO11, PO12, PSO2
5.	**CO5: Students learn to respectfully engage** with communities with purposive intent to contribute to society and sustainable development	PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12 PSO1, PSO2, PSO3
6.	**C06: Students are able to document and present** their community project findings in an academically robust manner	PO1, PO2, PO4, PO5, PO9, PO10, PO11, PO12, PSO2, PSO3

PO and PSO mapping with level of strength for Course Name: Community Connect (Course Code ECC301)

CO/PO Mapping
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low

Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1		1	1	2		3		1	1	1		
CO2	1	2	1	3		3		1	1	1		
CO3	3	3	3	3	2	3			1	2	1	1
CO4		3	3	3		3		3	3	3		1
CO5		2	1	1	1	3	3	3	2	3	1	1
CO6	2	3	1	1	3				2	2		2
Avg PO attainted	1	2.3	1.7	2.3	1	2.5	0.5	1.3	1.7	2	0.3	0.8

School: SET		**Batch : 2024-2028**
Program: B Tech		**Current Academic Year: 2024**
Branch:		**Semester: V**
1	Course Code	CSP 350
2	Course Title	**Design and Analysis of Algorithm lab**
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory/Elective
5	Course Objective	Objective of this course is to 1. Reinforce basic design concepts (e.g., pseudocode, specifications, top-down design) 2. Knowledge of algorithm design strategies 3. Familiarity with an assortment of important algorithms. 4. Enable students to analyze time and space complexity
6	Course Outcomes (same as theory course)	Students will be able to: **CO1: calculate** time complexity of searching algorithm **CO2**: **Write** program based on dynamic programming. **CO3: apply** greedy algorithm to any problem **CO4: develop** program based on advanced data structure CO5: **design** a program based on different string matching algorithm CO6**: implement** real world problem based on greedy and dynamic algorithm
7	Course Description	This course introduces concepts related to the design and analysis of algorithms. Specifically, it discusses recurrence relations, and illustrates their role in asymptotic and probabilistic analysis of algorithms. It covers in detail greedy strategies divide and conquer techniques, dynamic programming and max flow - min cut theory for designing algorithms, and illustrates them using a number of well-known problems and applications.
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on Searching and sorting**	
		1. WAP to demonstrate the concept of Linear and Binary Search 2. WAP to implement Merge sort 3. WAP to implement Quick Sort	CO1
	Unit 2	**Practical based on Dynamic Programming**	
		1. WAP to implement Matrix Chain Multiplication problem 2. WAP to demonstrate the concept of Longest Common Subsequence(LCS) 3. WAP to demonstrate concept of 0 – 1 Knapsack Problem	CO2, CO6
	Unit 3	**Practical based on Greedy Programming**	
		1. WAP to demonstrate concept of Minimum	CO3, CO6

		Spanning Tree(Prim's Algorithm) 2. WAP to demonstrate concept of Fractional Knapsack Problem 3. WAP to implement single source shortest problem using Dijkstra's Algorithm			
	Unit 4	**Practical based on Advance concepts**			
		WAP to demonstrate concept of Red Black Tree insertion and Deletion			CO4
	Unit 5	**Practical based on String Matching**			
		1. WAP to demonstrate the concept of Naïve String matching algorithm. 2. WAP to demonstrate the concept of Robin Karp Algorithm.			CO5
	Mode of examination	Lab			
	Weightage Distribution	CA	CE (Viva)	ESE	
		30%	30%	40%	
	Text book/s*	-			
	Other References				

PO and PSO mapping with level of strength for Course Name Design and Analysis of Algorithms Lab. Course Code CSP 350)

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	3	1	--	--	-	2	-	-	-	2	3	3
CO 2	2	3	3	2	2	--	--	-	2	-	-	-	3	2	2
CO 3	3	2	2	-	3	--	--	-	1	-	-	-	2	1	-
CO 4	2	3	3	3	1	--	--	-	3	-	-	-	3	3	1
CO 5	3	2	2	3	2	-	-	-	2	-	-	-	2	3	2
CO 6	2	3	3	1	3	-	-	--	1	-	-	-	3	2	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CSP 350	**Design and Analysis of Algorithms Lab**	2.5	2.7	2.5	2.4	2	-	-	-	1.8	-	-	-	2.5	2.3	2.2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: V**	
1	Course Code	**CSP391** Course Name: Project Based Learning -3	
2	Course Title	Project Based Learning -3	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project. 2.To understand the significance of problem and its scope. 3.Students will make decisions within a framework.	
6	Course Outcomes	Students will be able to: CO1: Identify and formulate problem statement. CO2: Design relational database schema. CO3: Develop the solution by using different aspects of programming language. CO4: Classify and understand various test techniques for verification and validation of project. CO5: Analyze and make use of modern for solving real word problems. CO6: Develop teamwork and need to engage in life-long learning, along with the ability to communicate effectively with others.	
7	Course Description	In PBL-3, the students will learn how to define the problem for developing projects, and Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1,CO4
	Unit 2	Use of the relational algebra operations from mathematical set theory (union, intersection, difference, and Cartesian product) and the relational algebra operations developed specifically for relational databases (select (restrict), project, join, and division)..	CO2,CO6
	Unit 3	Design; implement project work in any programming language.	CO3
	Unit 4	Use of various test tools and techniques for software verification and validation of project	CO4,CO5
	Unit 5	Demonstrate and execute Project with the team.	CO6
		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, ER diagrams, Use Case Diagrams, State Diagrams, Sequence Diagrams, Communication Diagrams, and Activity	

		Diagrams, Implementation Detail. Validation Reports. References, Test cases if any. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.			
	Mode of examination	Lab			
	Weight age Distribution	CA	CE	ESE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify and formulate problem statement.	PO1, PO2, PO4,PO6, PO8,PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Design relational database schema.	PO1, PO2, PO3,PO4,PO5, PO7, PO8, PO9, PO11, PO12 , PSO1,PSO2,PSO3
3.	CO3: Develop the solution by using different aspects of programming language.	PO1, PO2, PO3,PO4,PO5, PO6, PO8, PO9, PO11, PO12, PSO1,PSO2
4.	CO4: Classify and understand various test techniques for verification and validation of project.	PO1, PO2, PO3,PO4,PO5, PO8,PO9, PO10, PO11, PO12 ,PSO1,PSO2,PSO3
5.	CO5: Analyze and make use of modern for solving real word problems.	PO1, PO2, PO5, PO6, PO7, PO8, PO9, PO12 PSO1,PSO2
6.	CO6: Develop teamwork and need to engage in life-long learning, along with the ability to communicate effectively with others.	PO2, PO4, PO8,PO9, PO10, PO11, PO12,PSO1,PSO3

PO and PSO mapping with level of strength for Course Name Project Based Learning -3 (Course Code CSP354)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	1	-	1	2	-	2	1	2	2	3
CO2	3	2	2	2	2	-	-	1	2	-	2	1	2	1	1
CO3	3	2	2	2	2	3	-	1	2	-	2	1	2	2	-
CO4	3	3	2	2	3	-	-	1	2	-	-	1	2	2	2
CO5	3	2	-	-	3	-	-	1	2	-	-	1	2	2	-
CO6		1	-	1	-	-	-	2	2	3	3	3	1	-	1
Avg PO attained	3	2.2	1	1.5	1.7	0.7	0	1.2	2	1	2	1	2	1.5	1.2

School: SET		**Batch : 2024-2028**			
Program: B Tech		**Current Academic Year: 2024**			
Branch:		**Semester: V**			
1	Course Code	CSP398	Course Name: **Summer Internship-II**		
2	Course Title	**Summer Internship-II**			
3	Credits	2			
4	Contact Hours (L-T-P)	0-0-0			
	Course Status	UG			
5	Course Objective	1. Experience the activities and functions of business professionals. 2. Develop and refine oral and written communication skills. 3. Identify areas for future knowledge and skill development.			
6	Course Outcomes	Students will be able to: CO1. Integrate the concepts and strategies of academic study in a real time environment. CO2. Identify, formulate and model problems and find engineering solution based on a systems approach. CO3. Develop teamwork and apply prior acquired knowledge in problem solving. CO4. Develop communication, interpersonal and other critical skills required for career growth. CO5. Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards. CO6. Explore career alternatives prior to graduation.			
7	Course Description	An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.			
8	Outline syllabus				CO Mapping
	Unit 1	Define objectives and conditions for the internship, ensuring students that it is related to the study path carried out at the University			**CO1,CO2**
	Unit 2	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.			**CO2**
	Unit 3	The internship work plan is drawn up by developing team work and applies prior acquired knowledge in problem solving.			**CO3**
	Unit 4	Demonstrate and execute Project with the team. Submission of evaluation form and final report completed by the intern.			**CO4**
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.			**CO5,CO6**
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ETE	
		30%	30%	40%	

	Text book/s*	NA
	Other References	NA

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1. Integrate the concepts and strategies of academic study in a real time environment.	PO1,PO2,PO4,PO5,PO7,PO8,PO9, PSO1,PSO2,PSO3
2.	CO2. Identify, formulate and model problems and find engineering solution based on a systems approach.	PO1,PO2,PO3,PO4,PO5,PO7,PO8, PO9, PSO1,PSO2
3.	CO3. Develop teamwork and apply prior acquired knowledge in problem solving.	PO1,PO3,PO4,PO5, PO8,PO9,PO11,PO12, PSO1,PSO2,PSO3
4.	CO4. Develop communication, interpersonal and other critical skills required for career growth.	PO8,PO10
5.	CO5. Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards.	PO6,PO8
6.	CO6. Explore career alternatives prior to graduation.	PO12,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Summer Internship-II (CSP391)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	-	3	2	-	1	1	1	-	-	-	1	2	2
CO2	1	2	1	2	2	-	1	1	1	-	-	-	1	2	-
CO3	2	-	2	2	2	-	-	1	3	-	1	1	1	2	2
CO4	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO5	-	-	-	-	-	2	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	2	2	-
Avg PO attained	1	0.7	0.5	1.2	1	0.3	0.3	1.2	1	1	0	1	1	1.3	0.7

Technical Skill Enhancement Course-1 (Simulation Lab)

School: SET		**Batch : 2024-2028**	
Program: B Tech		**Current Academic Year: 2024**	
Branch:		**Semester: V**	
1	Course Code	CSP 395	Technical Skill Enhancement Course-1 (Simulation Lab)
2	Course Title	Simulation Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Lab	
5	Course Objective	The objective of this course is to provide the basic programming concepts of MATLAB such as – functions, arrays, loops, conditional statements, procedures.It alsoexpose students with visual representations of a model and its results.	
6	Course Outcomes	Students will be able to: **CO1:**Use basic fundamentals to write simple Matlab programs. **CO2:** Plot graphs in Matlab and use procedural functions. **CO3**: Writing Matlab programs with logic and flow control. **CO4:**Manipulate and work with text files. **CO5**:Make use of graphical user interfaces in MATLAB. **CO6**: Apply MATLAB Programming to solve real life problem	
7	Course Description	This course introduces the concepts of MATLAB programming, Modelling and simulation to identify the problems, and choose the relevant models and algorithms to apply. Matlab is used for scientific applications involving images, sound, and other signals.	
8	Outline syllabus		CO Mapping
	UNIT-1	**Introduction to MATLAB**	CO1,CO6
	A	Programming Environment: MATLAB Windows, A First Program	
	B	Expressions, Constants, Variables and assignment statement	
	C	Arrays	
	UNIT-2	**Graph Plots&Procedures and Functions**	CO2,CO6
	A	Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save	
	B	Procedures and Functions: Arguments and return values, M-files	
	C	Formatted console input-output, String handling	
	UNIT-3	**Control Statements**	CO3,CO6
	A	Conditional statements: If, Else, Else-if	
	B	Repetition statements: While	
	C	Repetition statements: for loop	

	UNIT-4	**Manipulating Text**			CO4,CO6
	A	Writing to a text file, Reading from a text file			
	B	Randomising and sorting a list			
	C	Searching a list			
	UNIT-5	**GUI Interface**			CO5,CO6
	A	Attaching buttons to actions			
	B	Getting Input, Setting Output			
	C	Develop MATALB Application			
	Mode of examination	Lab			
	Weightage Distribution	Project on Simulation based	CE	ESE	
		30%	30%	40%	
	Text book/s*				
	Other References	1.			

CO and PO Mapping

Mapping between Cos and Pos, PSO's		
Sl. No.	**Course Outcomes (COs)**	**Mapped Program Outcomes and PSO's**
1	**CO1:**Use basic fundamentals to write simple Matlab programs.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
2	**CO2:** Plot graphs in Matlab and use procedural functions.	**PO1,PO3,PO5,PO10,PO12,PSO1,PSO2,PSO3**
3	**CO3**: Writing Matlab programs with logic and flow control.	**PO1,PO2,PO3,PO5,PO12,PSO1,PSO2,PSO3**
4	**CO4:**Manipulate and work with text files.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
5	**CO5**:Make use of graphical user interfaces in MATLAB.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
6	**CO6**: Apply MATLAB Programming to solve real life problem	**PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO8,PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3**

PO and PSO mapping with level of strength for Course Name: Technical Skill Enhancement Course-1 CSP 395)

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO1 1	PO 12	PSO 1	PSO2	PSO3
CO1	1	-	1	-	2	-	-	-	-	-	-	1	1	2	1
CO2	1	-	1	-	2	-	-	-	-	2	-	1	1	2	1
CO3	1	2	1	-	2	-	-	-	-	-	-	1	1	2	1
CO4	1	-	1	-	2	-	-	-	-	-	-	1	1	2	1
CO5	1	-	1	-	2	-	-	-	-	-	-	1	1	2	1
CO6	2	2	3	3	2	2	1	-	2	3	2	2	2	3	1
Avg PO attained	1	0.7	1.3	0.5	2	0.3	0.2	0	0	1	0	1	1	2.2	1

TERM VI

Syllabus: CSE 353, Compiler Design

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	**CSE353** | Course Name: Compiler Design	
2	Course Title	**Compiler Design**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1. To provide students with an overview of the issues that arise in Compiler construction as well as to throw light upon the significant theoretical developments and tools that are deep rooted into computer science. 2. To introduce the major phases of Compiler construction and also its theoretical aspects including regular expressions, context-free grammars, Finite Automata etc.	
6	Course Outcomes	After the successful completion of this course, students will be able to : **CO 1:Explain** the concepts and different phases of compilation with compile time error handling **CO 2:Represent** language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language **CO 3:Compare** top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input **CO 4: Design** syntax directed translation schemes for a given context free grammar. **CO 5:Generate** intermediate code for statements in high level language, Benefits and limitations of automatic memory management. **CO 6:Apply** optimization techniques to intermediate code and generate machine code for high level language program	
7	Course Description	To provide students with an overview of the issues that arise in Compiler construction as well as to throw light upon the significant theoretical developments and tools that are deep rooted into computer science.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction	
	A	Introduction to Compiler, Phases and passes, Bootstrapping, Cross-Compiler	CO1, CO2

	B	Finite state machines and regular expressions and their applications to lexical analysis	CO1, CO2
	C	lexical-analyzer generator, Lexical Phase errors	CO1, CO2
	Unit 2	**Parsing Techniques**	
	A	The syntactic specification of programming languages: Context free grammars, derivation and parse trees.	CO2, CO3
	B	Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers. Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables	CO2, CO3
	C	Constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars. Syntactic phase errors and semantic errors.	CO2, CO3
	Unit 3	**Syntax Directed Translations And Intermediate Code Generation**	
	A	Syntax directed definition, Construction of syntax trees, syntax directed translation scheme	CO4,CO5
	B	Variants of Syntax Trees, Three Address Codes	CO4,CO5
	C	Translation of Expression, Type Checking and control flow.	CO4,CO5
	Unit 4	**Symbol table**	
	A	Data structure for symbols tables, representing scope information.	CO5
	B	Run-Time Administration: Implementation of simple stack allocation scheme	CO5
	C	Run Time Storage Management	CO5
	Unit 5	**Code Generation And Optimization**	
	A	Sources of Optimization of basic blocks and flow graphs	CO4,CO6
	B	Basic Blocks, Flow graphs, DAG	CO4,CO6
	C	Global Data Flow Analysis	CO4,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. 1.Aho, Sethi, Ulman, compilers Principles, Techniques, and Tools, Pearson Education, 2003	
	Other References	1. Lauden, Principles of Compiler Construction. 2. D. M. *Dhamdhere Compiler* Construction--Principles and Practice, Macmillan India,	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO 1:Explain** the concepts and different phases of compilation with compile time error handling	PO1,PO5,PO6,PO9,PO12,PSO1,PSO2
2.	**CO 2:Represent** language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language	PO1,PO2,PO3, PO4,PO5, PO12, PSO1, PSO2
3.	**CO 3:Compare** top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input	PO1,PO2,PO3,PSO1,PSO2
4.	**CO 4: Design** syntax directed translation schemes for a given context free grammar.	PO1,PO2,PO3, PO4,PO5,PO9, PSO2,PSO3
5.	**CO 5:Generate** intermediate code for statements in high level language, Benefits and limitations of automatic memory management.	PO1,PO2,PO3, PO4,PO5,PO9,PO12,PSO1,PSO2,PSO3
6.	**CO6:Apply** optimization techniques to intermediate code and generate machine code for high level language program	PO1, PO3,PO4, PO4,PO5,PO9,PO12 PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Compiler Design (Course Code CSE 353)

Cos	PO1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO 11	PO1 2	PS O1	PSO2	PSO3
CO1	3	--	--	--	3	--	--	--	2	--	--	3	2	1	--
CO2	2	2	3	3	2	--	--	--	--	--	--	2	3	2	--
CO3	3	3	3	--	--	--	--	--	--	--	--	--	3	2	--
CO4	1	2	3	3	3	--	--	--	3	--	--	--	--	3	2
CO5	1	1	2	3	2	--	--	--	3	--	--	3	1	2	2
CO6	2	--	3	3	2	--	--	--	3	--	--	3	3	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE353	Compiler Design	2	1.3	2.3	2	2	0	0-	0	1.8	0	0	2	2	2	1.2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VI**		
Branch:CSE				
1	Course Code	CSE032		
2	Course Title	Cryptography and Network Security		
3	Credits	3		
4	Contact Hours (L-T-P)	3-0-0		
	Course Status	Core		
5	Course Objective	The objective of this course is to provide an intention to explain basic concepts and algorithms of symmetric &asymmetric key cryptography, including encryption/decryption and key exchange with the application of cryptography and technique.		
6	Course Outcomes	On successful completion of this module students will be able to: CO1: Identify the basic concepts of computer security, algorithms of symmetric Key cryptography, including encryption/decryption. CO2: Apply the tools and methodologies used to perform mathematic concepts behind the cryptographic algorithms.. CO3: Explain the tools and methodologies used to perform Security analysis. CO4: Interpret use of cryptographic data integrity algorithms and user authentication protocols CO5: Examine security at application layer, transport layer and network layer. CO6: Compare various algorithm of cryptography used for Network Security.		
7	Course Description	This course will provide a deterministic approach of both the principles and practice of cryptography & network security. It covers the basic issues to be addressed by a network security capability, and explored by providing a tutorial and survey of cryptography and network security technology.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction& symmetric Key Cryptography**		
	A	Computer Security Concepts- OSI security Architecture, Security attacks, Services, mechanism, model of network security		CO1
	B	Classical encryption techniques- Substitution Cipher(Mono-alphabetic, Poly-alphabetic), Transposition cipher, Stegnography		CO1
	C	Block Cipher- Encryption Principles, DES and its variants, strength of DES		CO1
	Unit 2	**Mathematics of Cryptography**		
	A	Eucledian, Extended Eucledian Algorithm, EuilersTotient Function , Ferment little Theorem, Eulers		CO2

		theorem	
	B	Primality Testing-Miller Rabin test, Chinese Remainder Theorem	CO2, CO6
	C	Exponential- square and multiply method, Discrete Logarithm	CO2, CO6
	Unit 3	**Asymmetric Cryptography & Key Exchange**	
	A	Public Key cryptography-RSA, Cryptanalysis of RSA	CO3
	B	Elgamal cryptography, Elliptic Curve cryptography	CO3, CO6
	C	Key Management and distribution : KDC, Diffie Hellman Key Exchange	CO3, CO6
	Unit 4	**Digital signatures**	
	A	User Authentication protocol- Kerberos	CO4
	B	Digital Signature –RSA, Elgamal, DSS	CO4
	C	Data integrity algorithms-Hash Functions, MD5, SHA-512	CO4
	Unit 5	**Security**	
	A	Security at Application layer-Email Architecture, S/MIME, PGP-Scenarios, key rings	CO5
	B	Security at Transport layer-SSL(Services, Protocols)	CO5
	C	Security at Network layer-IPSec(Modes, Security Protocols-AH, ESP, Services provided by IPSEC)	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Atul Kahate , "Network Security ", Wiley India Pvt Ltd, 2010. 2. Michael T. Simpson, "Hands-on Cryptography & Network Security & Network Defense", Course Technology, 2010. 3. Rajat Khare, "Network Seuciryt and Cryptography & Network Security ", Luniver Press, 2006.	
	Other References	1. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001. 2. Behrouz A. Forouzan, “Cryptography And Network Security”- McGraw Hill 1. Internet as a resource for reference.	

CO and PO Mapping

S. No.	*Course Outcome*	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Identifybasic concepts of computer security, algorithms of symmetric Key cryptography, including encryption/decryption.	PO1, PO2, PSO1. PSO2
2.	CO2: Apply the tools and methodologies used to perform mathematic concepts behind the cryptographic algorithms..	PO1,PO2,PO3, PO4, PSO1,PSO2
3.	CO3: Explain the tools and methodologies used to perform Security analysis.	PO1, PO3, PO5, PSO1, PSO2

4.	CO4: Analyze and use cryptographic data integrity algorithms and user authentication protocols	PO1, PO4, PO6, PO7, PSO1,PSO2
5.	CO5. Examine security at application layer, transport layer and network layer.	PO5,PO7, PO8, PO9, PSO1,PSO2
6.	CO6: Compare various algorithm of cryptography used for Network Security.	PO10,PO11,PO12,PSO1,PSO3

PO and PSO mapping with level of strength for Course Name Cryptography and Network Security **(Course Code CSE032)**

Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE032_Cryptography and Network Security	CO1	3	2		-	-	-	-	-	-	-	-	-	3	1	-
	CO2	2	3	2	1	-	-	-	-	-	-	-	-	2	3	-
	CO3	2	-	2	-	3	-	-	-	-	-	-	-	2	2	1
	CO4	2	-	-	2	-	2	2	-	-	-	-	-	2	2	
	CO5	-	-	-	-	2	-	2	2	2		-	-	1	-	-
	CO6	-	-	-	-	-	-	-	-	-	2	2	2	2	-	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE032	Cryptography and Network Security y and Network Security	2.5	2.5	2	1.5	2.5	2	2	2	2	2	2	2	2	2	1.5

Strength of Correlation

1. Addressed to***Slight (Low=1) extent*** ***2.*** Addressed to***Moderate (Medium=2) extent***
3. Addressed to***Substantial (High=3) extent***

Syllabus: CSE041 SOFTWARE PROJECT MANAGEMENT

School: SET		**Batch : 2024-2028**			
Program: B.Tech		**Current Academic Year: 2024**			
Branch:CSE		**Semester: VI**			
Branch:		**Computer Science and Engineering**			
1	Course Code	CSE041			
2	Course Title	SOFTWARE PROJECT MANAGEMENT			
3	Credits	3			
4	Contact Hours (L-T-P)	3	0	0	
	Course Status	Core /Elective/Open Elective			
5	Course Objective	To provide fundamental skills of software Project management emphasizing on issues & hurdles associated with delivering successful projects. Apply project management concepts through working in a group as team leader or active team member on an IT project.			
6	Course Outcomes (6)	After successful completion of this course students should be able to: CO1: Define the Project Management principles while developing software. CO2: Explain different project scheduling techniques. CO3: Apply vario-+us project monitoring,control and review techniques CO4: Categorize various activities and estimate the risks involved in various project activities. CO5: Assess project quality and issues related to contract management. CO6: Discuss the impact of project planning on the performance of the organizations			
7	Course Description	This course is aimed at introducing the primary important concepts of project management related to managing software development projects. Students will also get familiar with the different activities involved in Software Project Management. Further, they will also come to know how to successfully plan and implement a software project management activity, and to complete a specific project in time with the available budget.			
8	Outline syllabus				CO Mapping
	Unit 1	**Introduction to Software Project Planning**			
	A	Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope Document, Project Management Cycle, SPM Objectives			CO1
	B	SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of Project Plan, Structure of a Software Project Management Plan			CO1
	C	Software Project Estimation, Estimation Methods, Estimation Models, Decision Process			CO1
	Unit 2	**Project Organization and Scheduling Project Elements**			
	A	Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle			CO2
	B	Ways to Organize Personnel, Project Schedule, Scheduling			CO2

		Objectives, Building the Project Schedule, Scheduling Terminology and Techniques		
	C	Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts		CO2
	Unit 3	**Project Monitoring and Control**		
A	Dimensions of Project Monitoring & Control, Earned Value Analysis		CO3, CO6	
B	Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI)		CO3	
C	Software Reviews, Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews		CO3	
	Unit 4	**Project Management Tools**		
	A	Software Configuration Items and Tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control		CO4
	B	Risk Management: Risks and Risk Types, Risk Breakdown Structure (RBS), Risk Management Process: Risk Identification, Risk Analysis, Risk Planning, Risk Monitoring		CO4, CO6
	C	Cost Benefit Analysis, Software Project Management Tools: CASE Tools, MS-Project		CO4, CO6
	Unit 5	**Software Quality and Staffing in Project Management**		
	A	Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model (CMM)		CO5, CO6
	B	SQA Activities, Formal SQA Approaches: Proof of Correctness, Statistical Quality Assurance, Product versus process quality management,		CO5
	C	Introduction, types of contract, stages in contract, placement, typical terms of a contract, contract management, acceptance		CO5, CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. Cottrell M. and Hughes B., "Software Project Management", 5th Edition, The McGraw-Hill Companies. 2. Walker Royce: ―Software Project Management-Addison-Wesley, 1998		
	Other References	1. Pankaj Jalote, “Software Project Management in practice”, 1st Edition, Pearson Education, 2005. 2. Kathy Schwalbe, “Information Technology Project Management” International Student Ed. THOMSON Course Technology		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define the Project Management principles while developing software.	PO1,PO3,PO5,PO9,PO10, PO11,PO12,PSO3
2.	CO2: Explain different project scheduling techniques.	PO1,PO3,PO5,PO9,PO10, PO11,PO12,PSO3
3.	CO3: Apply various project monitoring, control and review techniques	PO1,PO3,PO5,PO8,PO9, PO10,PO11,PO12,PSO3
4.	CO4: Categorize various activities and estimate the risks involved in various project activities.	PO1,PO3,PO5,PO8,PO9, PO10,PO11,PO12,PSO3
5.	CO5: Assess project quality and issues related to contract management.	PO1,PO3,PO5,PO6,PO8,PO9, PO10,PO11,PO12,PSO3
6.	CO6: Discuss the impact of project planning on the performance of the organizations	PO1,PO3,PO4,PO5,PO6,PO8,PO9, PO10,PO11,PO12,PSO3

PO and PSO mapping with level of strength for Software Project management (Course code CSE 041)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE041_ Software Project Management	CO1	3	-	1	-	1	-	-	-	3	2	3	2	-	-	2
	CO2	2	-	2	-	2	-	-	-	3	3	3	3	-	-	2
	CO3	2	-	3	-	2	-	-	1	3	2	3	3	-	-	3
	CO4	2	-	2	-	2	-	-	1	3	2	3	3	-	-	3
	CO5	1	-	3	-	2	3	-	1	3	3	3	3	-	-	3
	CO6	2	-	3	3	2	2	-	1	3	3	3	2	-	-	2

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE041	Software Project Management	2	-	2.3	3	1.8	2.5	-	1	3	2.5	3	2.6	-	-	2.5

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

CSE042 SOFTWARE TESTING

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VI**		
1	Course Code	CSE042		
2	Course Title	SOFTWARE TESTING		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
	Course Status	Core /Elective/Open Elective (Drop Down)		
5	Course Objective	The primary objective of this course is to introduce and instruct software testing and Quality assurance concepts, strategies, and techniques in order to develop a total understanding of the testing process and how it impacts the software project.		
6	Course Outcomes (5-6)	On successful completion of this module students will be able to CO1: Define Basic concepts of Testing and Debugging CO2: Make use of Control flow graph to perform white box testing CO3: Apply Data flow and integration testing to develop feasible software CO4: Classify techniques of Functional testing and design test cases CO5: Evaluate the software quality using Reviews, maturity models and ISO standards. CO6: Adapt software testing methods and modern software testing tools for their testing projects.		
7	Course Description	This course will examine fundamental software testing and related program analysis techniques. In particular, the important phases of testing will be reviewed, emphasizing the significance of each phase when testing different types of software. The course will also include concepts such as test generation, test oracles, test coverage, regression testing, mutation testing, program analysis (e.g., program-flow and data-flow analysis), and test prioritization.		
8	Outline syllabus			CO Mapping
	Unit 1	Introduction		
	A	Human and errors, Testing Objectives, Principles of Testing, Behaviour and Correctness, verification and validation, Debugging and its techniques		CO1
	B	Software metrics, Software Testing Life Cycle, Testing activities , Test Levels,		CO1
	C	Testing exit criteria, Bug defect life cycle, White Box and Black Box Testing, test planning and design		CO1
	Unit 2	Unit and Control Flow Testing		
	A	Concept of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing		CO2,CO6
	B	Control Flow Testing: Overview of Control Flow Testing,		CO2,CO6

		Control Flow Graph, Paths in a Control Flow Graph	
	C	Cyclomatic complexity, Path Selection Criteria, Generating test input	CO2,CO6
	Unit 3	Data Flow & Performance testing	
	A	Data Flow Anomaly, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms	CO3,CO6
	B	Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria	CO3,CO6
	C	Integration Testing: Introduction, Integration Techniques, Regression testing, Performance testing: Stress, Load, Volume, Soak and Spike, Overview of performance tools: Jmeter, Loadrunner, WebLoad	CO3,CO6
	Unit 4	Functional Testing	
	A	Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing: Monkeys & Gorillas, Error Guessing	CO4,CO6
	B	Test case designing – Test cases, Test case format, Test case designing, Acceptance testing and criteria	CO4,CO6
	C	Automation testing**:** Need for automation, categorization of Testing tools, Selection of testing tools, Guidelines for automated testing, Overview of commercial testing tools	CO4,CO6
	Unit 5	**Reviews and Quality Control**	
	A	Testing maturity model, Test metrics and measurements – project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion	CO5,CO6
	B	Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results	CO5,CO6
	C	Five Views of Software Quality, McCall's Quality Factors and Criteria, ISO 9000:2000 Software Quality Standard, evaluating software quality	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA / ESE	
		25% / 75%	
	Text book/s*	1. Sagar Naik & Piyu Tripathy, "Software Testing and Quality Assurance: Theory and Practice", Wiley.	
	Other References	1. Naresh Chauhan, "Software Testing : Principles and practices", Oxford university press 2. Boris Beizer, "Software Testing Techniques", Dreamtech Press 3. K.K. Aggrawal and Yogesh Singh, " Software Engineering" New Age International Publication	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define Basic concepts of Testing and Debugging	PO1,PO2,PO10,PO12,PSO3
2.	CO2: Make use of Control flow graph to perform white box testing	PO1,PO2,PO3,PO4,PO5,PO6, PO8,PO9,PO10,PO12,PSO1,PSO3
3.	CO3: Apply Data flow and integration testing to develop feasible software	PO1,PO2,PO3,PO4,PO5,PO6, PO8,PO9,PO10,PO12,PSO1,PSO3
4.	CO4: Classify techniques of Functional testing and design test cases	PO1,PO2,PO3,PO4,PO5,PO6, PO8,PO9,PO10,PO12,PSO1,PSO3
5.	CO5: Evaluate the software quality using Reviews, maturity models and ISO standards.	PO1,PO2,PO3,PO4,PO5,PO6, PO8,PO9,PO10,PO12,PSO1,PSO3
	CO6: Adapt software testing methods and modern software testing tools for their testing projects.	PO1,PO2,PO3,PO4,PO5,PO6,PO7, PO8,PO9,PO10,PO11,PO12,PSO1,PSO3

PO and PSO mapping with level of strength for Software Testing (CSE 042)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2	PSO3
CSE042_ Software Testing	CO1	2	1	-	-	-	-	-	-	-	3	-	2	-	-	3
	CO2	3	3	3	2	3	1	-	1	2	3	-	2	2	-	3
	CO3	3	3	3	2	2	2	-	1	2	3	-	2	2	-	3
	CO4	3	3	3	2	3	1	-	1	2	3	-	2	2	-	3
	CO5	3	3	2	2	2	2	-	1	2	3	-	2	2	-	3
	CO6	3	3	3	2	3	2	3	2	3	3	3	3	2	-	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE042	Software Testing	2.8	2.6	2.8	2	2.6	1.6	3	1.2	2.2	3	3	2.1	2	-	3

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		Batch : 2024-2028	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	**CSE051**	
2	Course Title	**Wireless Networks**	
3	Credits	3	
4	Contact Hours	**3-0-0**	
5	Course Objective	The objective of this course is to provide fundamental knowledge about Wireless networks, protocol stack and standards, understand and analyze the network layer solutions for Wireless networks, and make student aware of 4G Services.	
6	Course Outcomes	After successful completion of this course students should be able to: CO1. Enumerate, identify the foundation, and describe properties and capabilities of commonly used wireless technologies CO2. Identify and describe the infrastructure and requirements of Mobile IP and Mobile IPv6 CO3.Illustrate the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer CO4. Demonstrate the typical mobile networking infrastructure through a popular GSM protocol CO5. Identify and describe the structure of current 4G cellular networks. CO6.Compare applications of 4G technologies.	
7	**Course Description**	The course will describe concepts, technology and applications of wireless networking as used in current and next-generation wireless networks. In addition, the course addresses the fundamentals of wireless communications and provides an overview of existing and emerging wireless communication networks.	
8	**Course Contents**		
	Unit A	**WIRELESS LAN**	**CO Mapping**
	Unit A Topic 1	Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture,	CO1
	Unit A Topic 2	Physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2	CO1
	Unit A Topic 3	Bluetooth: Architecture, Radio Layer, Baseband layer, Link manager Protocol, security - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation for WIMAX	CO1
	Unit B	**MOBILE NETWORK LAYER**	
	Unit B Topic 1	Introduction - Mobile IP: IP packet delivery, Agent discovery, tunneling and encapsulation,	CO1, CO2
	Unit B Topic 2	IPV6-Network layer in the internet Mobile IP session initiation protocol	CO1, CO2
	Unit B Topic 3	Mobile ad-hoc network: Routing Destination Sequence distance vector, Dynamic source routing.	CO1, CO2

	Unit C	**MOBILE TRANSPORT LAYER**	
	Unit C Topic 1	TCP enhancements for wireless protocols - Traditional TCP: Congestion control, fast retransmit/fast recovery, Implications of mobility	CO3
	Unit C Topic 2	Classical TCP improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing	CO3
	Unit C Topic 3	Selective retransmission, Transaction oriented TCP - TCP over 3G wireless networks.	CO3
	Unit D	**WIRELESS WIDE AREA NETWORK**	
	Unit D Topic 1	Overview of UTMS Terrestrial Radio access network-UMTS Core network Architecture	CO3, CO4
	Unit D Topic 2	3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall,	CO3, CO4
	Unit D Topic 3	DNS/DHCP-High speed Downlink packet access (HSDPA)- LTE network architecture and protocol.	CO3, CO4
	Unit E	**4G NETWORKS**	
	Unit E Topic 1	Introduction – 4G vision – 4G features and challenges - Applications of 4G – 4G Technologies	CO5, CO6
	Unit E Topic 2	Multicarrier Modulation, Smart antenna techniques, OFDM-MIMO systems,	CO5, CO6
	Unit E Topic 3	Adaptive Modulation and coding with time slot scheduler, Cognitive Radio.	CO5, CO6
Mode of examination Weightage Distribution	Theory		
	CA	ESE	
	25%	75%	
	Reading Content		
	Text book*	1. Jochen Schiller, Mobile Communications, Second Edition, Pearson Education 2012.(Unit I,II,III)	
	other references	1. Erik Dahlman, Stefan Parkvall, Johan Skold and Per Beming, "3G Evolution HSPA and LTE for Mobile Broadband", Second Edition, Academic Press, 2008. 2.Anurag Kumar, D.Manjunath, Joy kuri, "Wireless Networking", First Edition, Elsevier 2011. 3.Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Enumerate, identify the foundation, and describe properties and capabilities of commonly used wireless technologies	PO1,PO3,PO8 PSO3
2.	CO2. Identify and describe the infrastructure and requirements of Mobile IP and Mobile IPv6	PO1,PO2,PO3,PO8 PSO3
3.	CO3.Illustrate the issues and solutions of various layers of mobile networks, namely MAC layer, Network Layer & Transport Layer	PO1,PO2,PO3,PO8 PSO3
4.	CO4. Demonstrate the typical mobile networking infrastructure through a popular GSM protocol	PO1,PO2,PO3,PO8 PSO3
5	CO5. Identify and describe the structure of current 4G cellular	PO1,PO2,PO3,PO4,PO5,PO8

	networks.	PSO3
6.	CO6.Compare applications of 4G technologies.	PO1,PO2,PO3,PO4,PO5,PO8 PSO3

PO and PSO mapping with level of strength for Course Name Wireless Networks (CSE051)

	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
	CO1	3	-	3	-	-	-	-	1	-	-	-	-	-	-	2
	CO2	3	2	3	-	-	-	-	1	-	-	-	-	-	-	2
	CO3	3	2	3	-	-	-	-	1	-	-	-	-	-	-	2
	CO4	3	2	3	-	-	-	-	1	-	-	-	-	-	-	2
	CO5	3	2	3	2	2	-	-	1	-	-	-	-	-	-	3
	CO6	3	2	3	2	2	-	-	1	-	-	-	-	-	-	3
	Avg.	3	1.6	3	0.6	0.6	-	-	1	-	-	-	-	-	-	2.3

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VI**		
Branch: CSE		**Semester: 6**		
1	Course Code	CSE052		
2	Course Title	**Risk Management**		
3	Credits	3		
4	Contact Hours (L-T-P)	3-0-0		
	Course Status	Core /Elective/Open Elective		
5	Course Objective	The objective of this course is to provide an insight to fundamentals of risk management in which business and society make an assessment of, control, regulation of risk management and transfer risk.		
6	Course Outcomes	On successful completion of this module students will be able to: CO1: define the basic concept of risk, types, uncertainty, managing, evaluation and prediction of risk. CO2: illustrate the key stages, component, framework, standards, architecture, strategy policies, and protocols process of the risk management. CO3: identify various risk, score them, control and opportunity risk CO4: apply approach/technique of risk assessment for strategy, projects and operations, and make use of risk matrix CO5: analyze uncertainty and risk in projects and apply measurement CO6: Explain, compare and apply risk management concept and techniques in projects to the success of the organization.		
7	Course Description	This course is to provide students with the concepts and fundamentals of risk management, a study of risk assessment and management techniques, methods, and models used in industry to minimize, control and communicate risks.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction**		
	A	The Concept of Risk, Risk and Uncertainty: Distinction, Classification of Risks		CO1, CO6
	B	Managing Risk, Sources and Measurement of Risk		CO1, CO6
	C	Risk Evaluation and Prediction, Types of Risk		CO1, CO6
	Unit 2	**Principles and aims of risk management**		
	A	Principles of risk management, Importance of risk management, Risk management activities, Perspectives of risk management		CO2, CO6

	B	Scope of risk management standards:- Risk management process, Risk management framework	CO2, CO6
	C	Risk architecture, strategy Policies and protocols	CO2, CO6
	Unit 3	**Risk classification Systems**	
	A	Shor, Medium and long term Risk	CO3, CO6
	B	FIRM risk scorecard, PESTLE risk classification system	CO3, CO6
	C	Hazard, control and opportunity risk	CO3, CO6
	Unit 4	**Risk Assessment**	
	A	Importance of risk assessment, Approaches to risk assessment, risk assessment techniques	CO4, CO6
	B	Risk Matrix, Risk Perception, Risk appetite	CO4, CO6
	C	Application of risk matrix, inherent and current level of risk, 4T's of risk response	CO4, CO6
	Unit 5	**Risk Management**	
	A	Importance of risk appetite – Risk tolerance, treatment, termination	CO5, CO6
	B	Introduction to Project Risk Management, uncertainty in projects , project lifecycle, Project risk analysis and management	CO5, CO6
	C	Operational risk management- definition, measurement, difficulties of measurement	CO5, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Paul Hopkin,"Fundamental of Risk Management- Understanding evaluating and implementing effective risk management", KoganPage London Philadelphia New Delhi.	
	Other References	1. Internet	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: define the basic concept of risk, types, uncertainty, managing, evaluation and prediction of risk.	PO1, PO2, PO7, P12, PSO1
2.	CO2: illustrate the key stages, component, framework, standards, architecture, strategy policies, and protocols process of the risk management.	PO1, PO4, PO5, PO8, PO9, PO10, PO11, PO12 PSO3
3.	CO3: identify various risk, score them, control and opportunity risk	PO1, PO2, PO4, PO9, P12, PSO1
4.	CO4: apply approach/technique of risk assessment for	PO1, PO3, PO5, PO6,

	strategy, projects and operations, and make use of risk matrix	PO9, P11, PSO3
5.	CO5: analyze uncertainty and risk in projects and apply measurement	PO1, PO2, PO4, PO5, PO7, PO9, PSO3
6.	CO6: explain, compare and apply risk management concept and techniques in projects to the success of the organization.	PO1, PO3, PO5, PO7, PO9, P11, P12, PSO2

PO and PSO mapping with level of strength for Course Name Risk Management (Course Code CSE052)

	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE052 _ Risk Management	CO1	3	-	-	-	-	-	1	-	-	-	-	1	2	-	-
	CO2	2	2	-	3	2	-	-	1	2	1	1	1	-	-	2
	CO3	2	-	-	-	-	-	-	-	2	-	-	1	1	-	-
	CO4	1	-	2	-	3	-	-	-	2	2	2	-	-	-	1
	CO5	2	2	-	2	1	-	1	-	2	1	1	-	-	-	1
	CO6	2	2	2	-	-	-	1	-	2	1	1	1	-	1	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE052	Risk Management	2	2	2	2.5	2	-	1	1	2	1.25	1.25	1	1.5	1	1.33

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	**Course Code**	**CSE472**	
2	**Course Title**	**Artificial Intelligence**	
3	**Credits**	**3**	
4	**Contact Hours (L-T-P)**	**3-0-0**	
	Course Status	**CORE**	
5	Course Objective	The objective of the course is to introduce basic fundamental concepts in Artificial Intelligence (AI), with a practical approach in understanding them. To visualize the scope of AI and its role in futuristic development.	
6	Course Outcomes	After the completion of this course, students will be able to: CO-1. ***Relate*** the goals of Artificial Intelligence and AI and non-AI solution. CO-2. ***Analyze and*** various AI uninformed and informed search algorithms. CO-3. ***Extend*** knowledge representation, reasoning, and theorem proving techniques to real-world problems CO-4. ***Make use of:*** Machine learning algorithms in various application domains of AI. CO-5. ***Select*** Artificial Intelligent based applications. CO-6. ***Develop*** independent (or in a small group) research and communicate it effectively.	
7	Course Description	In this course students will learn basic introduction of Artificial Intelligence, problem solving agents, reasoning, learning and applications of artificial intelligence.	
8	Outline syllabus		CO Mapping
	Unit 1	**INTRODUCTION TO AI**	
	A	Foundation of AI, Goals of AI, History and AI course line	CO1
	B	Introduction to Intelligent Agents; Environment; Structure of Agent	CO1
	C	AI Solutions Vs Conventional Solutions; a philosophical approach; a practical approach	CO1, CO2
	Unit 2	**PROBLEM SOLVING AGENTS**	
	A	Problem solving using Search Techniques; Problems; Solutions; Optimality	CO1, CO2
	B	Informed Search Strategies; Greedy Best-First; A* Search; Heuristic Functions	CO1, CO2
	C	Uninformed Search Strategies; BFS; DFS; DLS; UCS; IDFS; BDS	CO1, CO2
	Unit 3	**KNOWLEDGE & REASONING**	
	A	Knowledge-Based Agents; Logic; First-Order Logic; Syntax-Semantics in FOL; Simple usage;	CO3
	B	Inference Procedure; Inference in FOL; Reduction; Inference Rules;	CO3
	C	Forward Chaining; Backward Chaining; Resolution	CO3
	Unit 4	**LEARNING**	
	A	Common Sense Vs Learning; Components; Representations; Feedback	CO1, CO2, CO3,CO4
	B	Learning Types: Supervised; Unsupervised; Reinforcement Learnings	CO1, CO2, CO3,CO4

	C	Artificial Neural Networks: Introduction, types of networks; Single Layer and Multi-Layer n/w.		CO1, CO2, CO3,CO4
	Unit 5	**APPLICATIONS**		
	A	AI Present & Future; application case studies on NLP, Image Processing;		CO3, CO4, CO5, CO6
	B	Robotics – Hardware; Vision; Navigation based case studies;		CO3, CO4, CO5, CO6
	C	Ambient Intelligence case studies;		CO3, CO4, CO5, CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	**1. Rich E**& Knight K, **Artificial Intelligence,** Tata McGraw Hill, Edition 3.		
	Reference Books	1. Russell S &Norvig P, *Artificial Intelligence: A Modern Approach*, Prentice Hall. 2. Dan W. Patterson, Artificial Intelligence & Expert Systems, Pearson Education with Prentice Hall India. Indian Edition.		

Course Outcomes:

Sl. No.	Course Outcome (CO)	
CO-1:	***Relate*** the goals of Artificial Intelligence and AI and non-AI solution.	PO3, PO4, PO5, PO10, PSO1, PSO2, PSO3
CO-2:	***Analyze and*** various AI uninformed and informed search algorithms.	PO1, PO2, PO3, PO4, PO5, PO10, PSO1, PSO2, PSO3
CO-3:	***Extend*** knowledge representation, reasoning, and theorem proving techniques to real-world problems	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2, PSO3
CO-4:	***Make use of:*** Machine learning algorithms in various application domains of AI.	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2, PSO3
CO-5:	***Select*** Artificial Intelligent based applications.	PO1, PO2, PO3, PO4, PO5, PO9, PO10 PO12, PSO1, PSO2, PSO3
CO-6:	***Develop*** independent (or in a small group) research and communicate it effectively.	PO1, PO2, PO3, PO4, PO5, PO9, PO10 PO12, PSO1, PSO2, PSO3

Mapping of POs & COs: CO-PO and CO-PSO Mapping with level of strength

Course Objectives	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3
CO1	1	2	3	2	2					2		2	3	2	2
CO2	2	3	3	2	3					2		2	3	3	2
CO3	3	3	3	3	2	1	1			1	2	3	3	2	3
CO4	3	3	3	3	2	2	1			2	1	3	3	2	3
CO5	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
CO6	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2

School: SET		**Batch : 2024-2028**
Program: B.Tech		**Current Academic Year: 2024**
Branch:CSE		**Semester: VI**
1	**Course Code**	**CSE031**
2	**Course Title**	**Digital Image Processing**
3	**Credits**	**3**
4	**Contact Hours (L-T-P)**	**3-0-0**
	Course Status	**Program Elective 3**
5	**Course Objective**	The objective of this course is to introduce the students to the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images. Particular emphasis will be placed on covering methods used for image sampling and quantization, image transforms, image enhancement and restoration, image encoding, image analysis and pattern recognition. In addition, the students will learn how to apply the methods to solve real-world problems in several areas including medical, remote sensing and surveillance and develop the insight necessary to use the tools of digital image processing (DIP) to solve any new problem
6	**Course Outcomes (CO's)**	The Successful Completion of the Course Enables the Students to achieve the following learning Objectives: CO-1. Define the fundamental concepts of a digital image processing system. CO-2. Classify images in the frequency domain using various transformations. CO-3. Apply various operations for image enhancement and image restoration. CO-4. Analyse image segmentation and various representation techniques. CO-5. Choose various morphological operations for Digital Image processing. CO-6. Discuss and Build various image processing techniques for real life applications.
7	**Course Description**	Images and Visual information are integral parts of our daily lives. Digital image processing plays an important role in various practical applications including television, medical imaging modalities such as X-ray or ultrasound, photography, security, astronomy and remote sensing. This subject will introduce the fundamentals of image processing and manipulation, while image applications will be used for illustrations etc. The subject emphasizes general principles of image processing rather than specific applications and also to know and understand how computers can process digital images and some of the fundamental operations in image processing.

8	**Syllabus Outline**		**CO Mapping**
	Unit 1	**Introduction**	
	A	Fundamental of digital image processing, Elements of Visual Perception system, Applications of Digital Image Progressing	CO1
	B	Image Sampling and Quantization, Relationships between	CO1

		pixels , Image Sensing and Acquisition	
	C	Color image fundamentals – RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms – DFT, DCT, DWT.	CO1
	Unit 2	**Image Enhancement in Spatial and Frequency Domain**	
	A	Spatial Domain: Gray level Transformations, Histogram Processing **,** Basics of Spatial Filtering, Smoothing and Sharpening Spatial Filtering	CO2
	B	Frequency Domain: Introduction to Fourier Transform– Low-pass filter in frequency domain	CO2
	C	High-pass filters in frequency domain	CO2
	Unit 3	**Image Restoration and Compression**	
	A	Restoration Process model, Noise models , Mean Filters, Order Statistics, Adaptive filters	CO3
	B	Frequency Domain Filtering: Band reject Filters, Band pass Filters , Notch Filters, Optimum Notch Filtering, Inverse Filtering, Wiener filtering	CO3
	C	Encoder-Decoder model, Types of redundancies, Brief Overview of Lossy and Lossless Compression Techniques	CO3
	Unit 4	**Image Segmentation**	
	A	Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform	CO4,CO6
	B	Thresholding, Global Threshloding, adaptive thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding	CO4,CO6
	C	Region based segmentation, Watershed algorithm, Use of motion in segmentation	CO4,CO6
	Unit 5	**Morphological Image Processing**	
	A	Basics, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform	CO5 ,CO6
	B	Morphological Algorithms: Boundary Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons, pruning	CO5,CO6
	C	Geodesic Dilation, Erosion, Reconstruction by dilation and erosion. Applications of Morphological Image Processing	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	**CA** / **ESE**	
		25% / 75%	
	Text Books	1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.	
	Reference Books	1. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY. 2. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ. 3. Image Processing, Analysis and Machine Vision , by Milan Sonka ,Vaclav Hlavac , Roger Boyle Cengage Learning 3rd Edition 4. Digital Image Processing, by S Jayaraman, S Esakkirajan, T Veerakumar	

		TMH Publication
	Online Materials	1. https://nptel.ac.in/courses/106105032/ 2. http://users.rowan.edu/~polikar/WTtutorial.html

CO and PO Mapping

S. No.	Course Outcome (CO)	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1	Define the fundamental concepts of a digital image processing system.	PO1,PO2,PO3,PO5,PO8,PSO1,PSO2
2	Classify images in the frequency domain using various transformations.	PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO9,PO10,PSO1,PSO2
3	Apply various operations for image enhancement and image restoration.	PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO9,PO10,PO12,PSO1,PSO2
4	Analyse image segmentation and various representation techniques.	PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO9,PO10,PO12,PSO1,PSO2
5	Choose various morphological operations for Digital Image processing.	PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO9,PO10,PO12,PSO1,PSO2
6	Discuss and Build various image processing techniques for real life applications.	PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO9,PO10,PO12,PSO1,PSO2

CO-PO and PSO Mappings of Digital Image Processing CSE031

Subject	PO's / PSO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Digital Image Processing CSE031	CO1	3	3	3	3	1	1	1	1	1	2	1	3	2	3	1
	CO2	3	3	3	3	2	1	1	1	1	2	1	3	2	3	2
	CO3	3	3	3	3	2	1	1	1	1	2	1	3	3	3	2
	CO4	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
	CO5	3	3	3	3	2	2	1	1	1	2	1	3	3	3	2
	CO6	3	3	3	3	2	3	3	1	3	2	1	3	3	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSA031	**Digital Image Processing**	3.00	3.00	3.00	3.00	1.83	1.67	1.33	1.00	1.33	2.00	1.00	3.00	2.67	3.00	2.00

Total- 32.83
Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

Syllabus: CSE 053, Advanced Operating System

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	**CSE 053** Course Name: Advanced Operating System	
2	Course Title	Principles of Operating System	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	1. This course introduces the challenges for designing the operating systems. 2. Includes different design principles and algorithms. 3. Evaluation of algorithms proposed. 4. Implementation of algorithms and utilities.	
6	Course Outcomes	Students will be able : **CO1** Discuss the various synchronization, scheduling and memory management issues **CO2** Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system **CO3** Discuss the various resource management techniques for distributed systems **CO4** Identify the different features of real time and mobile operating systems **CO5** Install and use available open source kernel **CO6** Modify existing open source kernels in terms of functionality or features used	
7	Course Description	This course covers general issues of design and implementation of advanced modern operating systems. The focus is on issues that are critical to the applications of distributed systems and computer networks, which include inter process communication, distributed processing, sharing and replication of data and files.	
8	Outline syllabus		CO Mapping
	Unit 1	**FUNDAMENTALS OF OPERATING SYSTEMS**	
	A	Overview – Synchronization Mechanisms – Processes and Threads - Process Scheduling	CO1
	B	Deadlocks: Detection, Prevention and Recovery	CO1
	C	Models of Resources – Memory Management Techniques.	CO1
	Unit 2	**DISTRIBUTED OPERATING SYSTEMS**	
	A	Issues in Distributed Operating System – Architecture – Communication Primitives –	CO1, CO2
	B	Lamport's Logical clocks – Causal Ordering of Messages	CO1, CO2
	C	Distributed Mutual Exclusion Algorithms – Centralized and Distributed Deadlock Detection Algorithms – Agreement	CO1, CO2

		Protocols.	
	Unit 3	**DISTRIBUTED RESOURCE MANAGEMENT**	
	A	Distributed File Systems – Design Issues - Distributed Shared Memory – Algorithms for – Implementing Distributed Shared memory	CO1,CO2
	B	Issues in Load Distributing – Scheduling Algorithms – Synchronous and Asynchronous Check Pointing and Recovery	CO1,CO2, CO3,CO4
	C	Fault Tolerance – Two-Phase Commit Protocol – Non-blocking Commit Protocol – Security and Protection.	CO1,CO2, CO3,CO4
	Unit 4	**REAL TIME AND MOBILE OPERATING SYSTEMS**	
	A	Basic Model of Real Time Systems - Characteristics-Applications of Real Time Systems	CO1,CO2, CO3,CO5
	B	Real Time Task Scheduling - Handling Resource Sharing	CO1,CO2, CO3,CO5
	C	Mobile Operating Systems –Micro Kernel Design - Client Server Resource Access – Processes and Threads - Memory Management - File system.	CO1,CO2, CO3,CO5
	Unit 5	**CASE STUDIES**	
	A	linux System: Design Principles - Kernel Modules - Process Management Scheduling -	CO1,CO2, CO3,CO6
	B	Memory Management - Input-Output Management - File System	CO1,CO2, CO3,CO4, CO6
	C	Inter-process Communication. iOS and Android: Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System.	CO1,CO2, CO3,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: ESE	
		25%: 75%	
	Text book/s*	Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", Seventh Edition, John Wiley & Sons, 2004.	
	Other References	1. Mukesh Singhal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2001. 2. Daniel P Bovet and Marco Cesati, "Understanding the Linux kernel", 3rd edition, O'Reilly, 2005. 3. Rajib Mall, "Real-Time Systems: Theory and Practice", Pearson Education India, 2006.	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)

1.	**CO1** Discuss the various synchronization, scheduling and memory management issues	PO1,PO2,PO3,PO4,PSO1
2.	**CO2** Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system	PO1, PO3, PO4, PSO2
3.	**CO3** Discuss the various resource management techniques for distributed systems	PO1,PO2,PO3,PO4
4.	**CO4** Identify the different features of real time and mobile operating systems	PO9, PO10,PO11, PSO3
5	CO5 Install and use available open source kernel	PO1,PO2,PO8,PO9,PO10,PSO1
6.	**CO6** Modify existing open source kernels in terms of functionality or features used	PO1,PO2,PO10,PO11,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Principles of Operating System (Course Code CSE 053)

CSE 053	Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2
	CO5	2	2	3	-	-	-	-	3	3	1	2	-	3	-	-
	CO6	3	2	-	-	-	-	-	-	-	2	3	-	2	2	-

CSP472: Artificial Intelligence Lab

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	CSP472	
2	Course Title	**Artificial Intelligence Lab**	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	The objective of the course is to introduce basic fundamental concepts in Artificial Intelligence (AI), with a practical approach in understanding them. To visualize the scope of AI and its role in futuristic development. • To develop a sense of appreciation for traditional AI Programming • To use classical AI problems to understand cognitive process. • To have an overview of the various processes involved in Machine Learning • To develop a working model of real life problem base on Artificial Agent.	
6	Course Outcomes	After the completion of this course, students will be able to: CO-7. ***Relate*** the goals of Artificial Intelligence and AI and non-AI solution. CO-8. ***Analyze and*** various AI uninformed and informed search algorithms. CO-9. ***Extend*** knowledge representation, reasoning, and theorem proving techniques to real-world problems CO-10. ***Make use of:*** Machine learning algorithms in various application domains of AI. CO-11. ***Select*** Artificial Intelligent based applications. CO-12. ***Develop*** independent (or in a small group) research and communicate it effectively.	
7	Course Description	In this course students will learn basic introduction of Artificial Intelligence, problem solving agents, reasoning, learning and applications of artificial intelligence.	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on goal based problems**	**CO1**
		Sub unit - a, b and c detailed in Instructional Plan	
	Unit 2	**Practical related to uninformed search algorithm.**	**CO1,CO2**
		Sub unit - a, b and c detailed in Instructional Plan	
	Unit 3	**Practical related to informed search algorithm.**	**CO3**
		Sub unit - a, b and c detailed in Instructional Plan	
	Unit 4	**Practical related to knowledge representations and logical reasoning**	**CO4**
		Sub unit - a, b and c detailed in Instructional Plan	
	Unit 5	**Practical related to machine learning algorithms**	**CO5,CO6**

		Sub unit - a, b and c detailed in Instructional Plan			
	Mode of examination	Lab			
	Weightage Distribution	CE	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. **Rich E**& Knight K, **Artificial Intelligence,** Tata McGraw Hill, Edition 3.			
	Other References	1. Russell S &Norvig P, *Artificial Intelligence: A Modern Approach*, Prentice Hall. 2. Dan W. Patterson, Artificial Intelligence & Expert Systems, Pearson Education with Prentice Hall India. Indian Edition.			

Course Outcomes:

Sl. No.	Course Outcome (CO)	
CO-7:	***Relate*** the goals of Artificial Intelligence and AI and non-AI solution.	PO3, PO4, PO5, PO10, PSO1, PSO2, PSO3
CO-8:	***Analyze and*** various AI uninformed and informed search algorithms.	PO1, PO2, PO3, PO4, PO5, PO10, PSO1, PSO2, PSO3
CO-9:	***Extend*** knowledge representation, reasoning, and theorem proving techniques to real-world problems	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2, PSO3
CO-10:	***Make use of:*** Machine learning algorithms in various application domains of AI.	PO1, PO2, PO3, PO4, PO5, PO12, PSO1, PSO2, PSO3
CO-11:	***Select*** Artificial Intelligent based applications.	PO1, PO2, PO3, PO4, PO5, PO9, PO10 PO12, PSO1, PSO2, PSO3
CO-12:	***Develop*** independent (or in a small group) research and communicate it effectively.	PO1, PO2, PO3, PO4, PO5, PO9, PO10 PO12, PSO1, PSO2, PSO3

PO and PSO mapping with level of strength for Course Name Artificial Intelligence Lab (Course Code CSP472)

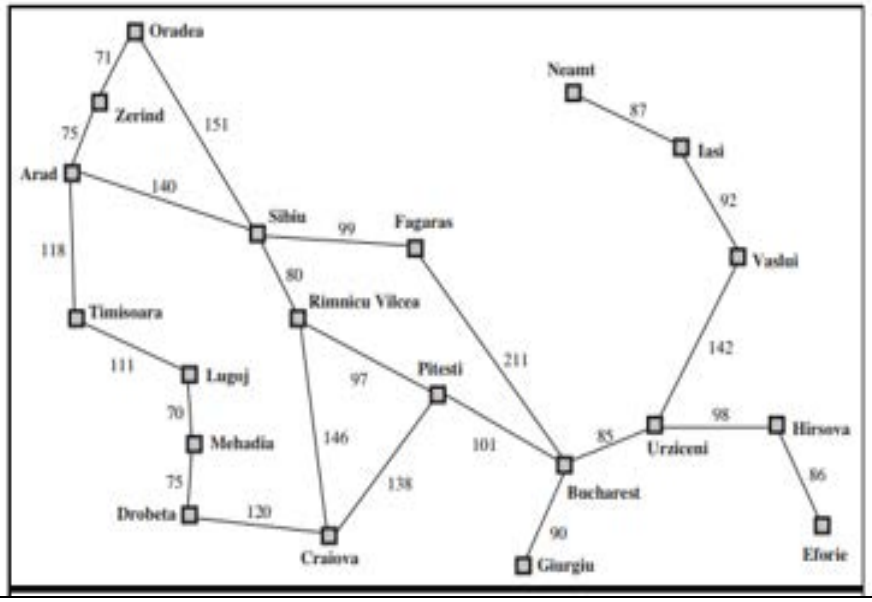
Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSP472: Artificial Intelligence Lab	CO1	1	2	3	2	2					2		2	3	2	2
	CO2	2	3	3	2	3					2		2	3	3	2
	CO3	3	3	3	3	2	1	1			1	2	3	3	2	3
	CO4	3	3	3	3	2	2	1			2	1	3	3	2	3
	CO5	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2
	CO6	2	3	3	3	3	2	2	2	3	2	2	2	3	3	2

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

List of Practical's:

	Unit 1	**Practical based on goal based problems**	
Week 1	A	Lab expt.1	Implementation of Water Jug Problem.
Week 2, 3	B	Lab expt.2	Introduction to Lisp, and basic programming in Lisp like following: i. Write a LISP function to compute sum of squares. ii. Write a LISP function to compute difference of squares. (if x > y return $x^2 - y^2$, Otherwise $y^2 - x^2$). iii. Write a Recursive LISP function which takes one argument as a list and return last element of the list. (Do not use last predicate.) iv. Write a Recursive LISP function which takes one argument as a list and return list except last element of the list. (Do not use butlast.) v. Write a Recursive LISP function which takes one argument as a list and return reverse of the list. (Do not use reverse predicate). vi. Write a Recursive LISP function which takes two arguments first an atom second a list returns a list after removing first occurrence of that atom within the list. vii. Write a Recursive LISP function which appends two lists together. viii. Write a recursive LISP function which takes 2 lists as arguments and returns a list containing alternate elements from each list.
Week 4	C	Lab expt.3	Advance programming in Lisp like following: i. Write a function that compute the factorial of a number.(factorial of 0 is 1, and factorial of n is n*(n-1)*...1.Factorial is defined only for integers greater than or equal to 0.) ii. Write a function that evaluate a fully parenthesized infix arithmetic expression. For examples, (infix (1+ (2*3))) should return 7. iii. Write a function that performs a depth first traversal of binary tree. The function should return a list containing the tree nodes in the order they were visited. iv. Write a LISP program for water jug problem. v. Write a LISP program that determines whether an integer is prime.
	Unit 2	**Practical related to uninformed search algorithm.**	
Week 5	a, b,	Lab expt.4	Refer following figure as map with distance details, Write a program in your preferred language to generate path from ARAD to BUCHREST, analyze result obtained by

			a) Depth First Search b) Breadth First Search c) Uniform Cost Search 
Week 6	C	Lab expt.5	Write a program in your preferred language to generate steps to solve Tower of Hanoi problem.
	Unit 3	**Practical related to informed search algorithm.**	
Week 7	Mid term		
Week 8	a,b,c	Lab expt.6	Write a program in your preferred language to solve the 8 puzzle Problem-using A* algorithm.
	Unit 4	**Practical related to knowledge representations and logical reasoning**	
Week 9	A	Lab expt.7	Write PROLOG program to Program to categorize animal characteristics.
Week 10	B	Lab expt.8	Write PROLOG program to solver for the linear equation A*X + B = 0. Let the predicate linear (A, B, X) return the root X of the equation.
Week 11	C	Lab expt.9	Write a PROLOG program that answers questions about family members and relationships includes predicates and rules which define sister, brother, father, mother, grandchild, grandfather and uncle. The program should be able to answer queries such as the following: father(x, Amit) grandson(x, y) uncle (sumit, puneet) mother (anita, x)
	Unit 5	**Practical related to machine learning algorithms**	
Week 12	a,	Project	Project Work Evaluation-0: Problem Statement
Week 13	B	Project	Project Work Evaluation-1: Design Specification
Week 14	C	Project	Project Work Evaluation-2: Development

Syllabus: Compiler Design lab

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	CSP353	
2	Course Title	Compiler Design Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	This laboratory course is intended to make the students experiment on the basic techniques of compiler construction and tools that can used to perform syntax-directed translation of a high-level programming language into an executable code. Students will design and implement language processors in C by using tools to automate parts of the implementation process. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, and object orientation.	
6	Course Outcomes	CO1 **Apply** different compiler writing tools to implement the different Phases CO2: **Understand** and define the role of lexical analyzer, use of regular expression and transition diagrams. CO3: **Implement** a parser for different context free grammars. CO4: **Construct** the intermediate representation CO5: **Implement** Symbol table CO6: **Compare** various code optimization techniques	
7	Course Description	This self-paced course will discuss the major ideas used today in the implementation of programming language compilers, including lexical analysis, parsing, syntax-directed translation, abstract syntax trees, types and type checking, intermediate languages, dataflow analysis, program optimization, code generation, and runtime systems. As a result, you will learn how a program written in a high-level language designed for humans is systematically translated into a program written in low-level assembly more suited to machines	
8	Outline syllabus		CO Mapping
	Unit 1	**Practical based on Designing of Finite Automata and Compiler construction tools**	
		1. Design a DFA which will accept all the strings containing even number of 0's and even number of 1's over an alphabet {0, 1} and write a program to implement the DFA. 2. Design a DFA which will accept all the strings containing mod 3 of 0's over an alphabet {0, 1} and write a program to implement the DFA. 3. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces,	CO1

		tabs and new lines	
	Unit 2	**Practical related to -- Parsing Techniques**	
		1. Write an algorithm and program on Recursive Descent parser. 2. Write an algorithm and program to compute FIRST and FOLLOW function. 3. Develop an operator precedence parser for a given language. 4. Implementation of shift reduce parsing algorithm and LR parser	CO2,CO3
	Unit 3	**Practical related to--- Syntax Directed Translations And Intermediate Code Generation**	
		1. Write code to generate abstract syntax tree. 2. Intermediate Code Generation	CO4
	Unit 4	**Practical related to---Symbol table**	
		Implement Symbol table	CO5
	Unit 5	**Practical related to---Code optimization techniques**	
		1. Implementation of Directed Acyclic Graph 2. Implementation of Code Generation	CO4,CO5
	Mode of examination	Lab	
	Weightage Distribution	CE / CE / ETE 30% / 30% / 40%	
	Text book/s*	1. Aho, Sethi, Ulman, compilers Principles, Techniques, and Tools, Pearson Education, 2003	
	Other References	1. Lauden, Principles of Compiler Construction. 2. D. M. *Dhamdhere Compiler* Construction--Principles and Practice, Macmillan India.	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1 **Apply** different compiler writing tools to implement the different Phases	PO1,PO5,PO6,PO9,PO12,PSO1,PSO2
2.	CO2: **Understand** and define the role of lexical analyzer, use of regular expression and transition diagrams.	PO1,PO2,PO3, PO4,PO5, PO12, PSO1, PSO2

3.	CO3: **Understand** and use Context free grammar, and parse tree construction.	PO1,PO2,PO3,PSO1,PSO2
4.	CO4: **Construct** the intermediate representation	PO1,PO2,PO3, PO4,PO5,PO9, PSO2,PSO3
5.	CO5: **Implement** Symbol table	PO1,PO2,PO3, PO4,PO5,PO9,PO12,PSO1,PSO2,PSO3
6.	CO6: **Compare** various code optimization techniques	PO1, PO3,PO4, PO4,PO5,PO9,PO12 PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Compiler Design Lab (Course Code CSP353)

Cos	PO1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO1 0	PO 11	PO1 2	PS O1	PSO2	PSO3
CO1	3	--	--	--	3	--	--	--	2	--	--	3	2	1	--
CO2	2	2	3	3	2	--	--	--	--	--	--	2	3	2	--
CO3	3	3	3	--	--	--	--	--	--	--	--	--	3	2	--
CO4	1	2	3	3	3	--	--	--	3	--	--	--	--	3	2
CO5	1	1	2	3	2	--	--	--	3	--	--	3	1	2	2
CO6	2	--	3	3	2	--	--	--	3	--	--	3	3	2	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

Average of non-zeros entry in following table (should be auto calculated).

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	P O 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSE353	**Compiler Design**	**2**	**1.3**	**2.3**	**2**	**2**	**0**	**0-**	**0**	**1.8**	**0**	**0**	**2**	**2**	**2**	**1.2**

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

Syllabus: CSP 396, Technical Skill Enhancement Course-2

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	CSP396	
2	Course Title	Technical Skill Enhancement Course-2(Application Development Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory/Elective	
5	Course Objective	Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system.	
6	Course Outcomes	On successful completion of the course, the student will be able to: **CO1:**Explainthe fundamentals of Android App Development. **CO2:**Make use of UI components to create Android applications. **CO3:**Examine the services and notifications in android to perform event driven programming. **CO4:**Develop database SQLite based Android applications. **CO5:**Analyze the usage of commonly available device sensors while building Android App. **CO6:**Develop application using Android software development tools.	
7	Course Description	The course will introduce concepts of the Android platform, Android application components, Activities and their lifecycle, UI design. It will also help students to build applications according to their problem statements.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Android**	
		Configuration of android SDK and test run of application on device, Create “Hello World” application, develop an Android Application to implement Activity life cycle.	CO1,CO6
	Unit 2	**Android UI Components**	
		Create a layout of Calculator using Grid layout, develop an Android Application to implement event listener on above layout, develop an Android Application to implement implicit intent.	CO1,CO2, ,CO6
	Unit 3	**Services and Notification**	
		Develop an Android Application to implement Service life cycle, Develop an Android Application to implement status bar notification, Create a menu with 5 options and selected option should appear in text box	CO3, ,CO6
	Unit 4	**Working with SQL Lite**	
		Create and Login applicationfor above mentioned problems, Create an application to implement Create, Insert and update operation on the database, Create an application to perform Delete and retrieve operation on the database.	CO4, ,CO6

	Unit 5	**Sensor Device**			
		Develop an Android Application to detect availability of all sensors, Develop an Android Application to Fetch data from sensors, Develop an Android Application for development of compass application with help of Orientation sensor			CO5, ,CO6
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ETE	
		30%	30%	40%	
	Text book/s*	1. AnubhavPradhan and Anil V. Deshpande, Composing Mobile Apps: Learn, Explore, Apply Using Android , 1st Edition, Wiley India.			
	Other References	1. Wei-MengLee , Beginning Android 4 Application Development. 2. Neil Smyth ,Android Studio Development essentials-Android 6			

CO and PO Mapping

Mapping between Cos and Pos, PSO's		
Sl. No.	**Course Outcomes (COs)**	**Mapped Program Outcomes and PSO's**
1	**CO1:** Explain the fundamentals of Android App Development.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
2	**CO2:** Make use of UI components to create Android applications.	**PO1,PO3,PO5,PO10,PO12,PSO1,PSO2,PSO3**
3	**CO3:** Examine the services and notifications in android to perform event driven programming.	**PO1,PO2,PO3,PO5,PO12,PSO1,PSO2,PSO3**
4	**CO4:** Develop database SQLite based Android applications.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
5	**CO5:** Analyze the usage of commonly available device sensors while building Android App.	**PO1,PO3,PO5,PO12,PSO1,PSO2,PSO3**
6	**CO6:** Develop application using Android software development tools.	**PO1,PO2,PO3,PO4,PO5,PO6,PO7,PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3**

PO and PSO mapping with level of strength for Course Name Technical Skill Enhancement Course-2 (Course Code CSP 396)

COs	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO9	PO 10	PO1 1	PO 12	PSO 1	PSO2	PSO3
CO1	1	-	1	-	2	-	-	-	-	-	-	1	1	2	1
CO2	1	-	1	-	2	-	-	-	-	2	-	1	1	2	1
CO3	1	2	1	-	2	-	-	-	-	-	-	1	1	2	1
CO4	1	-	2	-	2	-	-	-	-	-	-	1	1	2	1
CO5	2	-	1	-	2	-	-	-	-	-	-	1	1	2	1

CO6	2	2	3	2	2	2	1	-	2	3	2	2	2	3	1
Avg PO attained	1	0.7	1.5	0.3	2	0.3	0.2	0	0	1	0	1	1	2.2	1

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	**CSP390** Course Name: Project Based Learning -4	
2	Course Title	Project Based Learning -4	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1. To align student's skill and interests with a realistic problem or project. 2.To understand the significance of problem and its scope. 3.Students will make decisions within a framework.	
6	Course Outcomes	Students will be able to: CO1: Identify and formulate problem statement. CO2: Design relational database schema. CO3: Develop the solution by using different aspects of programming language. CO4: Classify and understand various test techniques for verification and validation of project. CO5: Analyze and make use of modern for solving real word problems. CO6: Develop teamwork and need to engage in life-long learning, along with the ability to communicate effectively with others.	
7	Course Description	In PBL-4, the students will learn how to define the problem for developing projects, and Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.	CO1,CO4
	Unit 2	Use of the relational algebra operations from mathematical set theory (union, intersection, difference, and Cartesian product) and the relational algebra operations developed specifically for relational databases (select (restrict), project, join, and division)..	CO2,CO6
	Unit 3	Design; implement project work in any programming language.	CO3
	Unit 4	Use of various test tools and techniques for software verification and validation of project	CO4,CO5
	Unit 5	Demonstrate and execute Project with the team.	CO6
		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, ER diagrams, Use Case Diagrams, State Diagrams, Sequence Diagrams, Communication Diagrams, and Activity	

		Diagrams, Implementation Detail. Validation Reports. References, Test cases if any. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.			
	Mode of examination	Lab			
	Weight age Distribution	CA	CE	ESE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify and formulate problem statement.	PO1, PO2, PO4,PO6, PO8,PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Design relational database schema.	PO1, PO2, PO3,PO4,PO5, PO7, PO8, PO9, PO11, PO12 , PSO1,PSO2,PSO3
3.	CO3: Develop the solution by using different aspects of programming language.	PO1, PO2, PO3,PO4,PO5, PO6, PO8, PO9, PO11, PO12, PSO1,PSO2
4.	CO4: Classify and understand various test techniques for verification and validation of project.	PO1, PO2, PO3,PO4,PO5, PO8,PO9, PO10, PO11, PO12 ,PSO1,PSO2,PSO3
5.	CO5: Analyze and make use of modern for solving real word problems.	PO1, PO2, PO5, PO6, PO7, PO8, PO9, PO12 PSO1,PSO2
6.	CO6: Develop teamwork and need to engage in life-long learning, along with the ability to communicate effectively with others.	PO2, PO4, PO8,PO9, PO10, PO11, PO12,PSO1,PSO3

PO and PSO mapping with level of strength for Course Name Project Based Learning – 4 (Course Code CSP390)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	1	-	1	2	-	2	1	2	2	3
CO2	3	2	2	2	2	-	-	1	2	-	2	1	2	1	1
CO3	3	2	2	2	2	3	-	1	2	-	2	1	2	2	-
CO4	3	3	2	2	3	-	-	1	2	-	-	1	2	2	2
CO5	3	2	-	-	3	-	-	1	2	-	-	1	2	2	-
CO6	-	1	-	1	-	-	-	2	2	3	3	3	1	-	1
Avg PO attained	3	2.2	1	1.5	1.7	0.7	0	1.2	2	1	2	1	2	1.5	1.2

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VI**	
1	Course Code	**ARP 306**	
2	Course Title	**Campus to Corporate**	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 4th phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	After completion of this course, students will be able to: CO1: Develop a creative resumes, cover letters, interpret job descriptions and interpret KRA and KPI statements and art of conflict management. CO2: Build negotiation skills to get maximum benefits from deals in practical life scenarios. CO3: Develop skills of personal branding to create a brand image and self-branding CO4: Acquire higher level competency in use of logical and analytical reasoning such as direction sense, strong and weak arguments CO5: Develop higher level strategic thinking and diverse mathematical concepts through building analogies, odd one out CO6: Demonstrate higher level quantitative aptitude such as average, ratio & proportions, mixtures & allegation for making business decisions.	
7	Course Description	This penultimate stage introduces the student to the basics of Human Resources. Allows the student to understand and interpret KRA | KPI and understand Job descriptions. A student also understands how to manage conflicts, brand hilf/herself, understand relations and empathise others with level-4 of quant, aptitude and logical reasoning	
8	Outline syllabus – ARP 306		
	Unit 1	**Ace the Interview**	**CO MAPPING**

	A	HR Sensitization (Role Clarity | KRA | KPI | Understanding JD) | Conflict Management	CO1
	B	Negotiation Skills | Personal Branding	CO3, CO4
	C	Uploading & Curating Resumes in Job Portals, getting Your Resumes Noticed | Writing Cover Letters | Relationship Management	CO1, CO3
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Sitting Arrangement & Venn Diagrams | Puzzles | Distribution | Selection	CO4
	B	Direction Sense | Statement & Conclusion | Strong & Weak Arguments	CO4
	C	Analogies, Odd One out | Cause & Effect	CO5
	Unit 3	**Quantitative Aptitude**	
	A	Average , Ratio & Proportions, Mixtures & Allegation	CO6
	B	Geometry-Lines, Angles & Triangles	CO6
	C	Problem of Ages | Data Sufficiency - L2	CO6
	Unit 4	**Verbal Abilities-4**	
	A	Antonyms and Synonyms	CO1
	B	Idioms and Phrases	CO2
	Unit 5	**Problem Solving and Case Studies**	
	A	Real time Case Study Solving Exercises	CO4
	B	Intra student Mock Situation Handling Exercises	CO4
	Evaluation Weightage	*(CA)Class Assignment/Free Speech Exercises / JAM – 60% | (ETE) Group Presentations/Mock Interviews(MIP's)/GD/ Reasoning, Quant & Aptitude– 40%*	
	Text book/s*	*Wiley's Quantitative Aptitude-P Anand | **Quantum CAT – Arihant Publications** | **Quicker Maths- M. Tyra** | Power of Positive Action (English, Paperback, Napoleon Hill) | Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness – Nathaniel Brandon | Goal Setting (English, Paperback, Wilson Dobson*	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ARP302.1	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.2	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.4	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-

TERM VII

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VII**		
Branch:		CSE		
1	Course Code	CSE063		
2	Course Title	Quantum Computing		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
	Course Status	Core /Elective/Open Elective		
5	Course Objective	Fundamentals of quantum information processing, including quantum computation, quantum cryptography, and quantum information theory. Topics include: the quantum circuit model, qubits, unitary operators, measurement, entanglement, quantum algorithms for factoring and search, quantum cryptographic key distribution, error-correction and fault-tolerance, information capacity of quantum channels, complexity of quantum computation.		
6	Course Outcomes	CO1: Analyze the behavior of basic quantum algorithms CO2: Demonstrate simple quantum algorithms CO3: Simulate a simple quantum error-correcting code CO4: Prove basic facts about quantum information channels CO5: Explain quantum computing and quantum protocols CO6: Illustrate information channels in the quantum circuit model.		
7	Course Description	This course teaches the fundamentals of quantum information processing, including quantum computation, quantum cryptography, and quantum information theory.		
8	Outline syllabus			CO Mapping
	Unit 1	Introduction		
	A	Computers and the Strong Church–Turing Thesis, Circuit Model of Computation		
	B	A Linear Algebra Formulation of the Circuit Model, Reversible Computation		CO1
	C	Quantum Physics and Computation		CO1, CO2
	Unit 2	LINEAR ALGEBRA AND THE DIRAC NOTATION		CO1, CO2,CO4
	A	The Dirac Notation and Hilbert Spaces, Dual Vectors, Operators		
	B	The Spectral Theorem, Functions of Operators		
	C	Tensor Products, The Schmidt Decomposition		CO1, CO2

		Theorem		
	Unit 3	A QUANTUM MODEL OF COMPUTATION		CO1, CO2
	A	The Quantum Circuit Model, Quantum Gates		CO1, CO2,CO5,CO6
	B	Universal Sets of Quantum Gates, Efficiency of Approximating Unitary Transformations		
	C	Implementing Measurements with Quantum Circuits		
	Unit 4	INTRODUCTORY QUANTUM ALGORITHMS		CO1,CO2,CO3
	A	Probabilistic Versus Quantum Algorithms, Phase Kick-Back		CO1,CO2,CO3
	B	The Deutsch Algorithm, The Deutsch–Jozsa Algorithm		CO1,CO2,CO3
	C	Simon's Algorithm		
	Unit 5			
	A	Tools for Analysing Probabilistic Algorithms		CO2,CO3,CO4
	B	Solving the Discrete Logarithm Problem When the Order of a Is Composite		CO3,CO4
	C	Computing Schmidt Decompositions		CO2, CO4,CO5
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	"An Introduction to Quantum Computing", Phillip Kaye Raymond Laflamme, Michele Mosca		
	Other References			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Analyze the behavior of basic quantum algorithms	
2.	CO2: Demonstrate simple quantum algorithms	PO1, PO2, PO5, PO8, PO12, PSO3
3.	CO3: Simulate a simple quantum error-correcting code	PO1, PO2, PO3, PSO3
4.	CO4: Prove basic facts about quantum information channels	PO1, PO2, PO3, PO5, PO9, PO12, PSO1
5.	CO5: Explain quantum computing and quantum protocols	PO1, PO2, PO4, PO5, PO6, PO8, PSO2
6.	CO6: Illustrate information channels in the quantum circuit model	PO1, PO2, PO3, PO8, PO9, PSO2,

PO and PSO mapping with level of strength for Course Name Quantum Computing (Course Code CSE063)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
Quantum Computing	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
	CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
	CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
	CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
	CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
	CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
	Quantum Computing	3	2.7	1.1	1	1.5	1	.5	1.3	.8	.5	.5	.8	1	1	1

Strength of Correlation

1. Addressed to *Slight (Low=1) extent* *2.* Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

Syllabus: CSE062 MOBILE COMPUTING

School: SET		**Batch : 2024-2028**			
Program: B.Tech		**Current Academic Year: 2024**			
Branch:CSE		**Semester: VII**			
1	Course Code	CSE062			
2	Course Title	MOBILE COMPUTING			
3	Credits	3			
4	Contact Hours (L-T-P)	3	0	0	
	Course Status	Core /Elective			
5	Course Objective	The objective of the course is to impart knowledge of mobile and wireless computing systems and techniques			
6	Course Outcomes (5-6)	On successful completion of this module students will be able to CO1: synthesize the basic concepts and principles in mobile computing. CO2: analyze the concept of wireless& telecommunication networks. CO3: synthesize the concepts of IEEE802.11, Bluetooth and HYPERLAN. CO4: Understand the concept of mobile IP & various Routing Protocols CO5: synthesize the concepts of Mobile Transport Layer & WAP CO6: Comparison of all the protocols			
7	Course Description	This course will cover various topics of mobile computing, networking, and systems, including but not limited to: applications of smart phones, cellular networks, embedded sensor systems, localization systems, energy efficiency of mobile devices, wearable and vehicular mobile systems, mobile security etc.			
8	Outline syllabus				CO Mapping
	Unit 1	**INTRODUCTION**			
	A	Wireless transmission , Frequencies for radio transmission			CO1
	B	Signals , Antennas , Signal Propagation , Multiplexing, Modulations			CO1
	C	Spread spectrum, MAC, SDMA , FDMA , TDMA , CDMA , Cellular Wireless Networks			CO1
	Unit 2	**TELECOMMUNICATION NETWORKS**			
	A	GSM: Mobile services, System architecture, Radio interface, Protocols			CO2
	B	Localization and calling, Handover, Security			CO2
	C	General Packet Radio Service (GPRS): GPRS Architecture, GPRS network nodes,			CO2
	Unit 3	**WIRELESS LANS**			
	A	Introduction to IEEE 802.11b/g/n			CO3
	B	Bluetooth technologies and architecture.			CO3
	C	HIPERLAN, WML programming			CO3
	Unit 4	**MOBILE NETWORK LAYER**			
	A	Mobile IP Goals, Entities, IP packet Delivery Agent Advertisement and Discovery, Registration.			CO4

	B	Hidden and exposed terminal problems ,Routing protocols classification,		CO4
	C	DSDV, DSR, AODV ,Security		CO4
	Unit 5	**Mobile Transport Layer & Wireless Application Protocol**		
	A	Traditional TCP, Indirect TCP,		CO5
	B	Snooping TCP, Mobile TCP		CO5,CO6
	C	WAP: Protocols, Architecture		CO5,CO6
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	2. JochenSchiller : Mobile Communication, Pearson Education. 3. U. Hansman and L. Merck : Principles of Mobile Computing", 2nd Ed., Springer		
	Other References	4. A. S. Tanenbaum. : Computer Networks, 4th Ed., Pearson Education. 5. D. Milojicic, F. Douglis. : Mobility Processes, Computers and Agents",Addison Wesley 6. D.B. Lange and M. Oshima : Programming and Deploying Java Mobile Agents with Aglets, Addison Wesley.		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: synthesize the basic concepts and principles in mobile computing.	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2
2.	CO2: analyze the concept of wireless& telecommunication networks.	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2
3.	CO3: synthesize the concepts of IEEE802.11, Bluetooth and HYPERLAN.	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2
4.	CO4: Understand the concept of mobile IP & various Routing Protocols	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2
5.	CO5: synthesize the concepts of Mobile Transport Layer & WAP	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2
6.	CO6: Comparison of all the protocols	PO1, PO2, PO4, PO5, PO10, PSO1, PSO2

PO and PSO mapping with level of strength for Mobile Computing (CSE 062)

Course Code_ Course Name	CO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PS O3
CSE062_ MOBILE COMPUTI NG	CO1	3	3	-	2	3	-	-	-	-	2	-	-	3	2	-
	CO2	3	3	-	2	3	-	-	-	-	2	-	-	3	2	-
	CO3	3	3	-	2	3	-	-	-	-	2	-	-	2	3	-
	CO4	3	3	-	2	3	-	-	-	-	2	-	-	3	2	-
	CO5	3	3	-	2	3	-	-	-	-	2	-	-	2	2	-
	CO6	3	3	-	2	3	-	-	-	-	2	-	-	2	2	-
Avg.		3	3	-	2	3	-	-	-	-	2	-	-	2	2	-

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VII**		
Branch:		**CSE**		
1	Course Code	CSE071		
2	Course Title	Introduction to Internet of Things		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Elective		
5	Course Objective	In this course, student will explore various concepts of Internet of things such as things, enabling technologies, M2M to IoT and IoT architecture. This course also discusses the security challenges and then provides answers on how to successfully manage IoT security and build a safe infrastructure for smart devices. In the end they will also be able to identify the challenges in IoT and its various areas of application.		
6	Course Outcomes	CO1: Define the general concepts of Internet of Things. CO2: Recognize the basic M2M Ecosystem and change from M2M to IoT. CO3: Outline the concepts of IoT platform. CO4: Explain IoT security and vulnerability threats. CO5: Examine the challenges in IoT specific application. CO6: Discuss the various domains where IOT can be applied successfully.		
7	Course Description	This course introduces the concepts for internet of things and how we can embed it into our daily lives for the development of life style. It will also help students to understand the applications according to their problem statements.		
8	Outline syllabus			CO Mapping
	Unit 1	**Introduction to IoT**		
	A	Defining IoT, History of IoT, Importance of IoT , IoT Basic Characteristics, Enabling Technologies of IoT		CO1
	B	About the Internet in IoT, IoT Advantages and Disadvantages, M2M Overview, M2M Features		CO1
	C	M2M Ecosystem, Comparison of the Main Characteristics of M2M and IoT, M2M Applications		CO1
	Unit 2	**IoT Architecture**		
	A	Basic Building blocks of IoT system: Sensors, Processors, gateways, Applications		CO1, CO2
	B	Physical design of IoT: Things in IOT, IoT Protocols, Logical design of IoT: IoT Functional Blocks, IoT Communication Models. IoT Communication API's		CO1, CO2
	C	IoT Service Oriented Architecture (SOA), API Oriented Architecture.		CO1, CO2
	Unit 3	**Introduction to IoT Platform**		
	A	IoT Working, Introduction to Arduino and Raspberry Pi		CO1, CO3

	B	The SENSEnut Platform, Peripheral Hardware Specific Calls: DIO Functions, I^2C Functions	CO1, CO3
	C	MAC functions: General Functions, Coordinator Functions, genMac Functions	CO1, CO3
	Unit 4	**Vulnerabilities, Attacks, and Countermeasures**	
	A	Cyber security versus IoT security and cyber-physical systems, Need to secure IoT	CO1, CO4, CO5
	B	Primer on threats, vulnerability, and risks (TVR)	CO1, CO4, CO5
	C	Common IoT attacks, Today's IoT attacks , Threat modeling for an IoT system	CO1, CO4, CO5
	Unit 5	**Domain specific applications of IoT**	
	A	Home automation concept and case study	CO1, CO3, CO6
	B	Industry applications concept and case study	CO1, CO3, CO6
	C	Surveillance applications concept and case study, Other IoT applications	CO1, CO3, CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. The Internet of Things: Connecting Objects to the Web edited by Hakima Chaouchi, Reference for Unit-1. 2. Introduction to Internet of Things, Prof. Sudip Misra, NPTEL Lectures Notes, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Reference for Unit 2, 3 (c), 4. 3. Internet of Things, Rajkumar Buyya, Reference for Unit 3 (c) 4. Arshdeep Bahga and Vijay Madisetti, “Internet of Things – A Hand-on Approach”, Universities press, 2015, Reference for Unit 3 (B) 5. API REFERENCE GUIDE: SENSEnuts WSN sensation 6. Practical Internet of Things Security, Brian Russell, Drew Van DurenCopyright © 2016 Packt Publishing	
	Other References	1. Charalampos Doukas , "Building Internet of Things with the Arduino", Create space, April 2002 2. Dr. Ovidiu Vermesan and Dr. Peter Friess, “Internet of Things: From research and innovation to market deployment”, River Publishers 2014. 3. Contiki : The open source for IOT, www.contiki-os.org	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Define the general concepts of Internet of Things.	PO1, PO2, PO3, PO6, PO7, PO12, PSO1
2.	CO2: Recognize the basic M2M Ecosystem and change from M2M to IoT.	PO1, PO2, PO3, PO6, PO7, PO12, PSO1
3.	CO3: Outline the concepts of IoT platform.	PO1, PO2, PO3, PO4, PO6, PO7, PO12, PSO1
4.	CO4: Explain IoT security and vulnerability threats.	PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, P011, PO12, PSO1, PSO2, PSO3
5.	CO5: Examine the challenges in IoT specific application.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12, PSO1
6.	CO6: Discuss the various domains where IOT can be applied successfully.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO12, PSO1

PO and PSO mapping with level of strength for Course Name Introduction to Internet of Things (Course Code CSE071**)**

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
_ Introduction to Internet of Things	**CO1**	3	1	1	-	-	2	1	-	-	-	-	3	3	-	-
	CO2	2	2	1	-	-	1	3	-	-	-	-	3	3	-	-
	CO3	3	1	1	2	-	2	1	-	-	-	-	3	3	-	-
	CO4	**3**	**3**	**3**	**3**	**2**	**2**	**-**	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**3**
	CO5	3	3	3	3	3	2	3	-	-	-	-	3	3	-	-
	CO6	2	2	2	2	3	2	3	-	-	-	-	3	3	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO2
	Introduction to Internet of Things	2.7	2.0	1.8	2.5	2.7	1.8	2.2	3.0	3.0	3.0	3.0	3.0	2.8	2.0	3.0

Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VII**		
Branch:		CSE		
1	Course Code	CSE072		
2	Course Title	Parallel Computing Algorithms		
3	Credits	2		
4	Contact Hours (L-T-P)	2	0	0
	Course Status	Core /Elective/Open Elective		
5	Course Objective	Design and analysis of parallel algorithms on various parallel network model, with emphasis on time complexities after implementation, a comparative study of various architecture with respect to time complexity. Understanding the fundamental of parallel algorithms.		
6	Course Outcomes	CO1: Acquire the skill to design and develop parallel algorithms with efficient time complexity. CO2: Explain various terminology of parallel processing which is required to design and understand the future processor architectures. CO3: Demonstrate the skill to choose the technology to use, based on the requirements and functionality of multi-processor architecture based on the design parameters of the parallel architectures. CO4: Explain how large-scale parallel systems are architecture and how massive parallelism are implemented in accelerator architectures CO5: Design efficient parallel algorithms and applications CO6: Analyse performance and modeling of parallel programs		
7	Course Description	This course introduces critical methods and techniques related to parallel computing. Particularly, the course focuses on hardware, algorithm, and programming of parallel systems, providing students a complete picture to understand pervasive parallel computing.		
8	Outline syllabus			CO Mapping
	Unit 1	Introduction		
	A	Introduction to Parallel Processing Approach		
	B	Difference between Parallel Processing and Serial Processing, Background, Flynn's Taxonomy for serial and parallel computer architecture		CO1
	C	Parallel Algorithms, Performance of Parallel Algorithm.		CO1, CO2
	Unit 2	Basic Techniques and Different Network Architecture		CO1, CO2,CO4
	A	Criteria to evaluate processor organization		
	B	Mesh Networks, Binary Tree Networks, Hypertree Networks, Pyramid Networks, Butterfly Networks, Hypercube (Cube-Connected) Networks,		
	C	Cube-Connected Cycle Networks, Shuffle-Exchange Networks, Case Studies Based on the Parallel Network Architecture.		CO1, CO2
	Unit 3	Parallel Architectures		CO1, CO2
	A	Multiprocessors, Uniform Memory Access (UMA) Multiprocessors and Non-Uniform Memory Access, Mesh of Trees Architecture,		CO1, CO2,CO5,CO6
	B	Applications based on MoT, Advantages/Disadvantages of MoT based on parallel parameters, Multi-Mesh Architecture,		
	C	Applications based on MM, Advantages/Disadvantages of MM based on parallel parameters Multi-Mesh of Trees Architecture, Advantages of MMT over MM and MoT		
	Unit 4	Parallel Algorithms on Different Architectures		CO1,CO2,CO3

	A	One to One Communication Algorithm on Multi-Mesh Architecture and Multi-Mesh of Trees Architecture,		CO1,CO2,CO3
	B	All-to-All Algorithm Communication Algorithm on Multi-Mesh Architecture and Multi-Mesh of Trees Architecture,		CO1,CO2,CO3
	C	Sorting Algorithms on MMT, Case Studies based on MMT Architecture		
	Unit 5	Parallel computing Application		
	A	Performance measurement and analysis of parallel programs		CO2,CO3,CO4
	B	Problem solving on clusters using MapReduce		CO3,CO4
	C	Warehouse-scale computing		CO2, CO4,CO5
	Mode of examination	Theory		
	Weightage Distribution	CA	ESE	
		25%	75%	
	Text book/s*	1. "Introduction to Parallel Computing", 2nd Ed, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar		
	Other References	1. "Using MPI: Portable Parallel Programming with the Message-Passing Interface", 3rd Ed - William Gropp, Ewing Lusk, Anthony Skjellum 2. "Programming Massively Parallel Processors: A Hands-on Approach", 3rd Ed. - David B. Kirk, Wen-mei W. Hwu		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Acquire the skill to design and develop parallel algorithms with efficient time complexity.	
2.	CO2: Explain various terminology of parallel processing which is required to design and understand the future processor architectures.	PO1, PO2, PO5, PO8, PO12, PSO3
3.	CO3: Demonstrate the skill to choose the technology to use, based on the requirements and functionality of multi-processor architecture based on the design parameters of the parallel architectures.	PO1, PO2, PO3, PSO3
4.	CO4: Explain how large-scale parallel systems are architecture and how massive parallelism are implemented in accelerator architectures	PO1, PO2, PO3, PO5, PO9, PO12, PSO1
5.	CO5: Design efficient parallel algorithms and applications	PO1, PO2, PO4, PO5, PO6, PO8, PSO2
6.	CO6: Analyse performance and modeling of parallel programs	PO1, PO2, PO3, PO8, PO9, PSO2,

PO and PSO mapping with level of strength for Course Name Parallel Computing (Course Code CSE072)

Course Code_ Course Name	CO's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Parallel Computing	CO1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
	CO2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
	CO3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
	CO4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
	CO5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
	CO6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
	Parallel Computing	3	2.7	1.1	1	1.5	1	.5	1.3	.8	.5	.5	.8	1	1	1

S*trength of Correlation*

1. Addressed to *Slight (Low=1) extent* *2.* Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VII**		
Branch:		**CSE with Specialization in AI & ML**		
1	Course Code	**CSE473**	**Machine Learning**	
2	Course Title	**Machine Learning**		
3	Credits	3		
4	Contact Hours (L-T-P)	3	0	0
	Course Status	Core		
5	Course Objective	Students are Expected to learn and develop Comprehensive Understanding of the of the following Concepts and Techniques: 1. To introduce the ideas of learning rule and implement them based on human experience. 2. To conceptualize the working of human brain using SVM, RF and ANN. 3. To become familiar with decision boundaries that can learn from available examples and generalize to form appropriate learning rules for inference systems. 4. To provide the mathematical background for SVM, RF and Neural Network based classification techniques. 5. To understand and demonstrate how to solve patterns learning from a large series of data using computer based learning algorithms		
6	Course Outcomes	A Successful completion of this Course Ensures the following Outcomes **CO 1 : Define basics of** Machine Learning and stochastic concepts. **CO-2 : Classify and Compare** existing models to understand the applicability in solve real world societal problems. **CO-3 : Identify develop and apply** mathematical models to find sustainable solutions. **CO-4 : Analyse** the logical ability to apply feature engineering to extract hierarchical patterns existing in real life problems. **CO-5 : Evaluate** the learning models to glance the upcoming world through it. **CO-6 :** Discuss the applicability of Machine learning Approaches to develop sustainable solutions using professional ethics.		
7	Course Description	This course introduces computational learning paradigm for critical & implementable understanding for supervised and unsupervised learning based problem areas.		
8				CO Mapping
	Unit 1	**Core Concepts of Machine Learning**		
	A	What is Machine Learning? What kind of problems can be tackled using machine learning? The ML Mindset, Introduction to Machine Learning Problem Framing(Common ML Problems, ML Use Cases, Identifying Good Problems for ML, Hard ML Problems), Machine Learning Applications(Image Recognition, Speech Recognition, Medical Diagnosis, Statistical Arbitrage, Learning Associations), Standard learning tasks(Machine Learning Pipeline, Classification, Regression, Ranking, Clustering, Dimensionality reduction or Manifold learning)		CO1
	B	Learning Stages(Features, Labels, Hyperparameters, Validation Samples, Test Samples, Loss Function, Hypothesis Tests), Learning Scenarios(Supervised learning, Unsupervised learning,		CO1, CO2

		Semi- Supervised learning, Transductive inference, On-line learning, Reinforcement learning, Active learning), Generalization Supervised Learning, Unsupervised Learning, Reinforcement learning)	
	C	Data Preparation and Feature Engineering in ML(Data and Features, Information, Knowledge, Data Types, Big Data), Data Preprocessing: An Overview(Data Quality: Why Preprocess the Data?, Major Tasks in Data Preprocessing), Data Cleaning(Missing Values, Noisy Data, Data Cleaning as a Process), Data Integration(The Entity Identification Problem, Redundancy and Correlation Analysis, Tuple Duplication, Detection and Resolution of Data Value Conflicts), Data Reduction(Overview of Data Reduction Strategies, Attribute Subset Selection, Data Reduction, Histograms, Clustering, Sampling, Data Cube Aggregation), Data Transformation and Data Discretization(Overview of Data Transformation Strategies, Data Transformation by Normalization, Discretization by Binning, Discretization by Histogram Analysis, Discretization by Cluster, Decision Tree, and Correlation Analyses, Concept Hierarchy Generation for Nominal Data)	CO1, CO2
	Unit 2	**Supervised Learning Algorithms - Part One**	
	A	How Supervised Learning Algorithms Work ? Steps (Bias-variance trade off, Function complexity and amount of training data, Dimensionality of the input space, Noise in the output values, Algorithms, Other factors to consider (Heterogeneity of the data, Redundancy in the data, Presence of interactions and non-linearities	CO1, CO2, CO6
	B	Linear Regression Model Representation, Linear Regression Learning the Model (Simple Linear Regression, Ordinary Least Squares, Gradient Descent), Regularization / Shrinkage Methods (Bias-variance trade-off, Overfitting Issues, Lasso Regression, Ridge Regression), Making Predictions with Linear Regression(Cost Function, Feature Scaling, Normalization, Mean Normalization, Learning Rate, Automatic Convergence Test)	CO1, CO2, CO6
	C	Logistic Regression, The Logistic Model (Latent variable interpretation, Logistic function, odds, odds ratio, and logit, Definition of the logistic function, Definition of the inverse of the logistic function, Interpretation of these terms, Definition of the odds, The odds ratio, Multiple explanatory variables), Model fitting ("Rule of ten", Iteratively reweighted least squares (IRLS), Evaluating goodness of fit, Limitations of Logistic Regression), Linear discriminant analysis (LDA for two classes, Assumptions, Discriminant functions, Discrimination rules, Eigenvalues, Effect size), Practical use and Applications (Bankruptcy prediction, Face recognition, Marketing, Biomedical, studies), Comparison to Logistic Regression	CO1, CO2, , CO6
	Unit 3	**Supervised Learning Algorithms - Part Two**	
	A	Support Vector Machines, Linear SVM (Hard-margin, Soft-margin), Nonlinear Classification, Computing the SVM classifier(Primal, Dual, Kernel trick), Modern methods(Sub-gradient descent, Coordinate descent), Empirical risk minimization(Risk minimization, Regularization and stability, SVM and the hinge loss, Target functions), Properties(Parameter selection, Issues)	CO1,CO2,CO3, , CO6
	B	Introduction to Artificial Neural Networks (Feed-forward Network Functions, Weight-space symmetries), Network Training (Parameter optimization, Local quadratic approximation, Use of	CO1,CO2,CO3, CO6

		gradient information, Gradient descent optimization), Error Backpropagation(Evaluation of error-function derivatives, Simple examples, Efficiency of backpropagation)	
	C	Decision Tree Learning (Decision tree representation, ID3 learning algorithm, Entropy, Information gain, Overfitting and Evaluation, Overfitting, Validation Methods, Avoiding Overfitting in Decision Trees, Minimum-Description Length Methods, Noise in Data), Random Forests Algorithm (Preliminaries: decision tree learning, Bagging, From bagging to random forests, Extra Trees, Properties, Variable importance)	CO1,CO2,CO3, CO6
	Unit 4	**Unsupervised Learning**	
	A	Unsupervised Learning (What is Unsupervised Learning?), Clustering Methods (Method Based on Euclidean Distance, Method Based on Probabilities, Hierarchical Clustering Methods, Method Based on Euclidean Distance)	CO2,CO3,CO4, CO6
	B	k-means Clustering Algorithm (Standard algorithm (naive k-means), Initialization methods), Applications (Vector quantization, Cluster analysis, Feature learning) Gaussian mixture models , Expectation-Maximization method	CO2,CO3,CO4, CO6
	C	Principal Component Analysis for making predictive models (First component, Further components, Covariances, Dimensionality reduction, Singular value decomposition), Properties and limitations of PCA (Properties, Limitations), Computing PCA using the covariance method, Typical Applications	CO2,CO3,CO4, CO6
	Unit 5	**Parameter Estimation, Model Evaluation and Ensemble Methods**	
	A	Parameter Estimation (Point Estimation, Maximum Likelihood Estimation, Unbiased Estimation, Confidence Intervals for One Mean, Two Mean, Variances)	CO2,CO5,CO6
	B	Model Evaluation (ML Model Validation by Humans, Holdout Set Validation Method, Cross-Validation Method for Models, Leave-One-Out Cross-Validation, Random Subsampling Validation, Teach and Test Method, Bootstrapping ML Validation Method, Running AI Model Simulations, Overriding Mechanism Method), The ROC Curve	CO3,CO5,CO6
	C	**Ensemble Methods (Ensemble Theory, Ensemble Size, Voting and Averaging Based Ensemble Methods Boosting, Weightage Average, Stacking, Bagging, Boosting and Bootstrap Aggregating)**	CO4,CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / ESE: 75%	
	Text book/s*	1. Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag. 2. Foundations of Machine Learning, Second Edition By Mehryar Mohri, Afshin Rostamizadeh and Ameet Talwalkar, MIT Press, Second Edition, 2018. 3. Introduction to Machine Learning, Third Edition, By Ethem Alpaydin, The MIT Pressmitpress.mit.edu › books › introduction-machine-learni...	
	Other References	1. Baldi, P. and Brunak, S. (2002). Bioinformatics: A Machine Learning Approach. Cambridge, MA: MIT	

		Press. 2. Russel, S. and Norvig, P. (2003). Artifiical Intelligence: A Modern Approach. 2ndEdition. New York: Prentice-Hall. 3. Cohen, P.R. (1995) Empirical Methods in Artificial Intelligence. Cambridge, MA: MIT Press. 4. https://www.toptal.com/machine-learning/ensemble-methods-machine-learning.	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO 1 : *Define basics of*** *Machine Learning and stochastic concepts.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
2.	**CO-2 : *Classify and Compare*** *existing models to understand the applicability in solve real world societal problems.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
3.	**CO-3 : *Identify develop and apply*** *mathematical models to find sustainable solutions.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
4.	**CO-4 : *Analyse*** *the logical ability to apply feature engineering to extract hierarchical patterns existing in real life problems.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
5.	**CO-5 : *Evaluate*** *the learning models to glance the upcoming world through it.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
6.	**CO-6 :** *Discuss the applicability of Machine learning Approaches to develop sustainable solutions using professional ethics.*	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Machine Learning **(Course Code** CSE473**)**

Subject	PO's / PSO's	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
Concepts of Machine Learning **(Course Code** CSA-201**)**	CO1	3	3	3	3	3	3	2	-	1	3	1	3	2	2	1
	CO2	3	3	3	3	3	3	3	-	2	3	3	3	3	3	3
	CO3	3	3	3	3	3	3	3	-	2	3	3	3	3	3	3
	CO4	3	3	3	3	3	3	3	-	2	3	3	3	3	3	3
	CO5	3	3	3	3	3	3	3	-	2	3	3	3	3	3	3
	CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	Course Name	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CSA-201	Concepts of Machine Learning	3.00	3.00	3.00	3.00	3.00	3.00	2.83	0.5.00	2.00	3.00	2.67	3.00	2.83	2.83	2.67

Total- 41.83
Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SET		**Batch : 2024-2028**		
Program: B.Tech		**Current Academic Year: 2024**		
Branch:CSE		**Semester: VII**		
Branch:		CSE		
1	Course code	CSE073		
2	Course title	3D printing and software tools		
3	Credits	2		
4	Contact hours (l-t-p)	2	0	0
	Course status	Core /elective/open elective		
5	Course objective	This course will help understand the technical principles and workflows of polymers, metals, and composites.		
6	Course outcomes	Co1: apply the unique advantages of 3d printing to their designs. Co2: compare additive manufacturing to traditional technologies and choose the best technology for a given application. Co3: distinguish between various 3d printing technologies and materials and select appropriately for a given application. Co4: discuss the economic implications of 3d printing including its impact on startup businesses and supply chains Co5: evaluate real-life scenarios and recommend the appropriate use of 3d printing technology Co6: explain current and emerging 3d printing applications in a variety of industries		
7	Course description	In this course students will gain broad understanding of the advances that led to today's manufacturing environment. They will understand how humans, machines and code work together to make things.		
8	Outline syllabus			Co mapping
	Unit 1	Introduction to 3d printing		
	A	Cutting, subtractive manufacturing		
	B	Forming		Co1
	C	Additive manufacturing		CO1, CO2
	Unit 2	Mesh		CO1, CO2,CO4
	A	Review of geometry terms		
	B	Things to consider when preparing a mesh file		
	C	Making process (a reminder), making by sharing		CO1, CO2
	Unit 3	Introduction to computer numerical control (cnc)		CO1, CO2
	A	Numerical control, functions of a machine tool, concept of numerical control, historical development, definition		CO1, CO2,CO5,CO6

	B	Advantages of cnc machine tools, evolution of cnc, advantages of cnc, limitations of cnc, features of cnc	
	C	The machine control unit (mcu) for cnc, classification of cnc machine tools, cnc machining centers	
	Unit 4	Blue print reading	CO1,CO2,CO3
	A	Reading the machining sketches, different geometrical tolerance symbols,	CO1,CO2,CO3
	B	Reading dimensional tolerances, understanding the views,	CO1,CO2,CO3
	C	Concept of first angle & third angle projection	
	Unit 5	Cnc milling	
	A	Fundamentals of cnc milling, familiarization of control panel	CO2,CO3,CO4
	B	Fundamentals of cnc programming, part programming techniques	CO3,CO4
	C	Machining practice on cnc milling, practice session at industry	CO2, CO4,CO5
	Mode of examination	Theory	
	Weightage distribution	CA / ESE	
		25% / 75%	
	Text book/s*	Liza Wallach Kloski, Nick Kloski – "Getting Started with 3D Printing_ A Hands-on Guide to the Hardware, Software, and Services Behind the New Manufacturing Revolution"-Maker Media, Inc (2016)	
	Other references		

Co and PO mapping

S. No.	Course outcome	Program outcomes (po) & program specific outcomes (pso)
1.	Co1: apply the unique advantages of 3d printing to their designs.	
2.	Co2: compare additive manufacturing to traditional technologies and choose the best technology for a given application.	PO1, PO2, PO5, PO8, PO12, PSO3
3.	Co3: distinguish between various 3d printing technologies and materials and select appropriately for a given application.	PO1, PO2, PO3, PSO3
4.	Co4: discuss the economic implications of 3d printing including its impact on startup businesses and supply chains	PO1, PO2, PO3, PO5, PO9, PO12, PSO1
5.	Co5: evaluate real-life scenarios and recommend the appropriate use of 3d printing technology	PO1, PO2, PO4, PO5, PO6, PO8, PSO2
6.	Co6: explain current and emerging 3d printing applications in a variety of industries	PO1, PO2, PO3, PO8, PO9, PSO2,

Po and pso mapping with level of strength for course name 3d printing and software tools (course code CSE073)

Course code_course name	Co's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
3d printing and software tools	Co1	3	3	-	-	2	-	-	3	-	-	-	3	-	-	3
	Co2	3	3	2	-	-	-	-	-	-	-	-	-	-	-	3
	Co3	3	3	2	-	2	-	-	-	2	-	-	2	3	-	-
	Co4	3	3	-	3	2	3	-	2	-	-	-	-	-	3	-
	Co5	3	2	3	-	-	-	-	3	3	-	-	-	-	3	-
	Co6	3	3	-	3	3	3	3	-	-	3	3	-	3	-	-

Average of non-zeros entry in following table (should be auto calculated).

Course code	Course name	Po 1	Po 2	Po 3	Po 4	Po 5	Po 6	Po 7	Po 8	Po 9	Po 10	Po 11	Po 12	Pso 1	Pso 2	Pso 3
	3d printing and software tools	3	2.7	1.1	1	1.5	1	.5	1.3	.8	.5	.5	.8	1	1	1

Strength of correlation

1. Addressed to *slight (low=1) extent 2.* Addressed to *moderate (medium=2) extent*
3. Addressed to *substantial (high=3) extent*

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VII**	
1	Course Code	**CSP497**	Course Name: **Capstone - 1**
2	Course Title	Major Project -1	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-0	
	Course Status	Compulsory	
5	Course Objective	Project being the student's last activity at the institution, it fulfills a purpose of synthesis of all the knowledge they have acquired throughout the different years. In addition, this knowledge must be used in a particular way, in order to solve a specific problem, which lets student demonstrate their aptitude by applying this knowledge.	
6	Course Outcomes	Students will be able to: CO1: Identify problem statement in engineering and technology in selected field of interest. CO2: Analyze the gathered information required to develop a project. CO3: Apply prior knowledge of mathematics, computer science and engineering. CO4: Participate in different teams and to focus on getting a working project done on time with each student being held accountable for their part of the project. CO5: Prepare the designs requirements, functional and conceptual design. CO6: Initiate the actual implementation of the project work to produce the deliverables and explain the work in written and oral forms.	
7	Course Description	The object of Major Project-I is to enable the student to take up investigative study in the broad field of Computer Science & Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on an individual basis or two/three students in a group, under the guidance of a Supervisor.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem identification, Literature survey/Gather & analyze information from multiple sources	CO1, CO2,CO4,
	Unit 2	Formulate solution/ Problem Description: Project Planning, Time and Cost Estimation and budgeting, Risk Management, Project scheduling and Planning Tools: Work Breakdown structure/ LRC/ Gantt charts/CPM/PERT Networks. Creating System Requirement Specifications (Functional & Non Functional)	CO1, CO2, CO3
	Unit 3	Preparing Design: Data Flow Diagrams & Flow Charts, Use of appropriate tools and techniques for project design	CO3, CO4
	Unit 4	Identify and Implement Project Modules.	CO4, CO5
	Unit 5	Use of appropriate tools/technologies for coding the modules	CO2, CO5, CO6
		Report on final problem statement, specifications, project schedule, final concept design and project schedule	

		Report and Presentation - Project Modules development			
	Mode of examination	Lab			
	Weightage Distribution	CA	CE	ESE	
		30%	30%	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify problem statement in engineering and technology in selected field of interest.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Analyze the gathered information required to develop a project.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
3.	CO3: Apply prior knowledge of mathematics, computer science and engineering.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
4.	CO4: Participate in different teams and to focus on getting a working project done on time with each student being held accountable for their part of the project.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
5.	CO5: Prepare the designs requirements, functional and conceptual design.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
6.	CO6: Initiate the actual implementation of the project work to produce the deliverables and explain the work in written and oral forms.	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Major Project -1 (Course Code CSP497)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	2	1	2	1	1	2	2	3	3
CO2	3	3	3	3	2	1	1	1	2	1	1	2	3	3	3
CO3	3	1	3	3	2	1	1	1	2	1	1	2	3	3	3
CO4	1	1	2	1	2	3	3	1	2	3	1	2	1	2	3
CO5	1	2	2	1	2	1	1	1	2	2	1	2	1	2	3
CO6	2	1	2	1	3	-	-	1	2	3	1	2	3	3	3

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)

School: SET		**Batch : 2024-2028**	
Program: B.Tech		**Current Academic Year: 2024**	
Branch:CSE		**Semester: VII**	
1	**Course Code**	**CSP473**	
2	**Course Title**	**Machine Learning Lab**	
3	**Credits**	**1**	
4	**Contact Hours (L-T-P)**	**0-0-2**	
	Course Status	Core	
5	Course Objective	1. Learn the basic concepts of Machine Learning algorithms. 2. Make use of Data sets in implementing the machine learning algorithms. 3. Implement the machine learning concepts and algorithms in any suitable language of choice.	
6	Course Outcomes	CO 1: Show the implementation of linear and logistic Regression on real life applications. CO-2: Interpretation of existing models to understand the solution environment. CO-3: Application of existing mathematical solutions to test real world problems. CO-4: Analyse the logical ability to apply clustering approach to extract hierarchical patterns existing in real life problems. CO-5 : Build the understanding of learning theory to glance the upcoming world through it. CO-6: Appraise recent trends in machine learning and applications.	
7	Course Description	This course introduces computational learning paradigm for critical & implementable understanding for supervised and unsupervised learning based problem areas.	
8	Outline syllabus		CO Mapping
	Unit 1	**Core Concepts of Machine Learning**	
		Write a Program to load and view data set file.	CO1
		Write a program to implement simple linear regression using housing price prediction problem.	CO1, CO2
		Write a program to implement binary logistic regression using cancer identification problem.	CO1, CO2
	Unit 2	**Supervised Learning Algorithms - Part One**	
		Write a program to implement gradient descent method for learning.	CO1, CO2, CO6
		Write a program to implement regularized linear regression.	CO1, CO2, CO6
		Write a program to implement regularized logistic regression.	CO1, CO2, , CO6
		Write a program to Normalize the data used in linear regression problem above before predicting prices, and then predict the housing prices.	CO1, CO2, CO6
	Unit 3	**Supervised Learning Algorithms - Part Two**	
		Write a program to implement Support Vector Machine regression using suitable dataset.	CO1,CO2,CO3, , CO6
		Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.	CO1,CO2,CO3, CO6
		Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.	CO1,CO2,CO3, , CO6
		Write a program to demonstrate the working of the Random Forest algorithm. Use an appropriate data set for classifying a new sample.	CO1,CO2,CO3, CO6
	Unit 4	**Unsupervised Learning**	

		Write a program to implement K-Means clustering algorithm using an appropriate dataset.			CO2,CO3,CO4, CO6
		Write a program to implement K-Means clustering algorithm using an appropriate dataset.			CO2,CO3,CO4, CO6
	Unit 5	**Hypothesis Testing, Parameter Estimation, Model Evaluation and Ensemble Methods**			
		Write a program to implement data split into training, cross validation and testing data.			CO2,CO5,CO6
		Implement an Ensemble approach by combining different models to solve time series based prediction problem.			CO3,CO5,CO6
		Conduct hypothesis testing using some statistical toolkit on appropriate problem.			CO4,CO5,CO6
	Mode of examination	Lab			
	Weightage Distribution	CE	CE	ESE	
		30%	30%	40%	
	Text book/s*	1. Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag. 2. Foundations of Machine Learning, Second Edition By Mehryar Mohri, Afshin Rostamizadeh and Ameet Talwalkar, MIT Press, Second Edition, 2018. 3. Introduction to Machine Learning, Third Edition, By EthemAlpaydin, The MIT Pressmitpress.mit.edu › books › introduction-machine-learni...			
	Other References	1) Baldi, P. and Brunak, S. (2002). Bioinformatics: A Machine Learning Approach. Cambridge, MA: MIT Press. 2) Russel, S. and Norvig, P. (2003). Artifiical Intelligence: A Modern Approach. 2ndEdition. New York: Prentice-Hall. 3) Cohen, P.R. (1995) Empirical Methods in Artificial Intelligence. Cambridge, MA: MIT Press. 4) https://www.toptal.com/machine-learning/ensemble-methods-machine-learning.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO 1 : Show the implementation of linear and logistic Regression on real life applications.	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
2.	CO-2 : Interpretation of existing models to understand the solution environment.	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
3.	CO-3 : Application of existing mathematical solutions to test real world problems.	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
4.	CO-4 : Analyse the logical ability to apply clustering approach to extract hierarchical patterns existing in real life problems.	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
5.	CO-5 : Build the understanding of learning theory to glance the upcoming world	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3
6.	CO-6: Appraise recent trends in machine learning and applications	PO1,PO2,PO3,PO4, PO5,PO6,PO7,PO8, PO9,PO10, PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Machine Learning **(Course Code** CSP473**)**

Subject	**PO's / PSO's**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
Concepts of Machine Learning **(Course Code** CAL-201**)**	CO1	3	3	3	3	3	3	2	1	1	3	1	3	2	2	1
	CO2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
	CO3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
	CO4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
	CO5	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
	CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Average of non-zeros entry in following table (should be auto calculated).

Course Code	**Course Name**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CAL-201	Concepts of Machine Learning	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**3.00**	**2.83**	**2.00**	**2.00**	**3.00**	**2.67**	**3.00**	**2.83**	**2.83**	**2.67**

Total- 41.83
Strength of Correlation

1. Addressed to ***Slight (Low=1) extent*** ***2.*** Addressed to ***Moderate (Medium=2) extent***
3. Addressed to ***Substantial (High=3) extent***

School: SSET		**Batch: 2024-2028**				
Program:B.TECH		**Current Academic Year: 2024**				
Branch: CSE		**Semester: VII**				
1	Course Code	CSP496				
2	Course Title	**Summer Internship-III**				
3	Credits	2				
4	Contact Hours (L-T-P)	0-0-0				
	Course Status	UG				
5	Course Objective	1. Experience the activities and functions of business professionals. 2. Develop and refine oral and written communication skills. 3. Identify areas for future knowledge and skill development.				
6	Course Outcomes	Students will be able to: CO1. Integrate the concepts and strategies of academic study in a real time environment. CO2. Identify, formulate and model problems and find engineering solution based on a systems approach. CO3. Develop teamwork and apply prior acquired knowledge in problem solving. CO4. Develop communication, interpersonal and other critical skills required for career growth. CO5. Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards. CO6. Explore career alternatives prior to graduation.				
7	Course Description	An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.				
8	Outline syllabus					CO Mapping
	Unit 1	Define objectives and conditions for the internship, ensuring students that it is related to the study path carried out at the University				**CO1,CO2**
	Unit 2	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.				**CO2**
	Unit 3	The internship work plan is drawn up by developing team work and applies prior acquired knowledge in problem solving.				**CO3**
	Unit 4	Demonstrate and execute Project with the team. Submission of evaluation form and final report completed by the intern.				**CO4**
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.				**CO5,CO6**
	Mode of examination	Lab				
	Weightage Distribution	CA	CE	ESE		
		30%	30%	40%		
	Text book/s*	NA				

	Other References	NA

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1. Integrate the concepts and strategies of academic study in a real time environment.	PO1,PO2,PO4,PO5,PO7,PO8,PO9,PSO 1,PSO2,PSO3
2.	CO2. Identify, formulate and model problems and find engineering solution based on a systems approach.	PO1,PO2,PO3,PO4,PO5,PO7,PO8,PO9 , PSO1,PSO2
3.	CO3. Develop teamwork and apply prior acquired knowledge in problem solving.	PO1,PO3,PO4,PO5, PO8,PO9,PO11,PO12, PSO1,PSO2,PSO3
4.	CO4. Develop communication, interpersonal and other critical skills required for career growth.	PO8,PO10
5.	CO5. Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards.	PO6,PO8
6.	CO6. Explore career alternatives prior to graduation.	PO12,PSO1,PSO2

PO and PSO mapping with level of strength for Course Name Summer Internship-III (CSP496)

CO/PO Mapping (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Low															
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	2	-	3	2	-	1	1	1	-	-	-	1	2	2
CO2	1	2	1	2	2	-	1	1	1	-	-	-	1	2	-
CO3	2	-	2	2	2	-	-	1	3	-	1	1	1	2	2
CO4	-	-	-	-	-	-	-	1	-	3	-	-	-	-	-
CO5	-	-	-	-	-	2	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	2	2	2	-
Avg PO attained	1	0.7	0.5	1.2	1	0.3	0.3	1.2	1	1	0	1	1	1.3	0.7

TERM VIII

School: SET		**Batch : 2024-2028**			
Program: B.Tech		**Current Academic Year: 2024**			
Branch:CSE		**Semester: VIII**			
1	Course Code	**CSP498**	Course Name: Capstone -2		
2	Course Title	CSP498_Capstone - 2			
3	Credits	8			
4	Contact Hours (L-T-P)	0-0-16			
	Course Status	Compulsory			
5	Course Objective	1. To understand the concept of project design after the completion of project planning 2. Students making decisions within a framework 3. Continuous evaluation of the project 4. A final product to be evaluated for quality			
6	Course Outcomes	Students will be able to: CO1: Demonstrate the implementation of the project. CO2: Identify the test procedure for each implemented module. CO3: Deploy and evaluate the modules to verify the required need of the project. CO4: Use different tools for communication, testing and report writing. CO5: Develop the attitude and ethics of a professional engineer. CO6: Demonstrate an ability to present and defend their project work to a panel of experts.			
7	Course Description	The objective of Major Project-II is to enable the student to extend further the development of project till testing and deployment under the guidance of a Supervisor.			
8	Outline syllabus				CO Mapping
	Unit 1	Complete the implementation of the project. Testing of the modules, Use of appropriate tools/techniques for testing			CO1, CO2
	Unit 2	Deploy & demonstrate developed modules of the project			CO2, CO3
	Unit 3	Preparing a Project Report in the standard format for being evaluated by the Supervisor			CO4, CO5
	Unit 4	Submission of Project and Report to Departmental Committee			CO4, CO5, CO6
	Unit 5	Final Presentation before Departmental Committee			CO6
	Mode of examination	Practical			
	Weight age Distribution	CE	CE	ESE	
		30%	30%	40%	

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Demonstrate the implementation of the project.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
2.	CO2: Identify the test procedure for each implemented module.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
3.	CO3: Deploy and evaluate the modules to verify the required need of the project.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
4.	CO4: Use different tools for communication, testing and report writing.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
5.	CO5: Develop the attitude and ethics of a professional engineer.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3
6.	CO6: Demonstrate an ability to present and defend their project work to a panel of experts.	PO1, PO2, PO3, PO4, PO5,PO6,PO7, PO8, PO9, PO10, PO11, PO12,PSO1,PSO2,PSO3

PO and PSO mapping with level of strength for Course Name Major Project -2 (Course Code CSP498)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	2	2	3	2	2	2	2	2	2	2	3	3	3
CO2	2	2	3	2	3	2	2	2	2	2	2	2	11	3	3
CO3	3	3	3	3	3	2	2	2	2	2	2	1	1	3	3
CO4	2	2	2	2	3	2	2	2	2	3	2	1	1	2	2
CO5	1	2	2	1	3	2	2	2	2	3	2	1	1	2	2
CO6	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2

1-Slight (Low) 2-Moderate (Medium) 3-Substantial (High)