SHARDA UNIVERSITY
Beyond Boundaries

SCHOOL OF ENGINEERING AND TECHNOLOGY
Bachelor of Technology- Information Technology

Programme Code: SET0102
Duration- 4 Years Full Time

PROGRAM STRUCTURE
AND
CURRICULUM & SCHEME OF EXAMINATION
2019-20

Program and Course Structure B.Tech IT

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**

Creative Campaign Can be TEDs: This is guiding principle for promotion and wide circulation among various stakeholder.
Guidelines: Similar Mnemonics can be designed by schools.

Core Values

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

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

1.2 Vision and Mission of the School

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 counselling.**

1.2.1Vision and Mission of the Department

Vision of the Department

To be known and recognized as the fountainhead of excellence in technical knowledge and research in computer science and engineering, and draw to it the students and scholars across nations.

Mission of the Department

1. To facilitate and foster the academia industry collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.
2. To strengthen core competences of students to be successful, ethical , effective problem solver in Computer Science & Engineering through analytical learning

1.3 Programme Educational Objectives (PEO)

1.3.1 Writing Programme Educational Objectives (PEO)

The Educational Objectives of UG Program in Computer Science Engineering are:

PEO1 : The Graduate will ensconce himself/herself as effective professionals by solving real life problems using exploratory and analytical skills along with the knowledge acquired in the field of Computer Science and Engineering.

PEO2 : The Graduate will demonstrate his/her ability to accustom to rapidly changing environment in advanced areas of Computer Science and scale new height in their profession through lifelong learning.

PEO3 : The Graduate will have the ability to work and communicate effectively as a team member or leader to complete the task with minimal resources, meeting deadlines.

PEO4 : The Graduate will embrace professional code of ethics in the profession while deliberately being part of projects which contributes to the society at large without disturbing the ecological balance.

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 School Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
PEO1:	**3**	**3**	**2**	**2**
PEO2:	**2**	**3**	**2**	**1**
PEO3:	**2**	**2**	**2**	**3**
PEO4:	**2**	**1**	**3**	**1**

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 "-"

1.3.2.1 Map PEOs with Department Mission Statements:

PEO Statements	Department Mission 1	Department Mission 2	Department Mission 3	Department Mission 4
PEO1:	**2**	**3**	**2**	**1**
PEO2:	**1**	**3**	**3**	**1**
PEO3:	**3**	**2**	**1**	**1**
PEO4:	**1**	**2**	**2**	**3**
PEO5:	**2**	**3**	**2**	**1**

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 modelling 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: Familiarity and practical proficiency with a broad area of programming concepts and provide new ideas and innovations towards research and societal issues.

PSO2: Understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics 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.

PSO4: Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing environmental and societal problems.

PSO5: To prepare graduates to apply their skills in creating innovative computing solutions by employing effective communication, teamwork, leadership, ethical practices and professionalism.

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
PSO4	2	2	1	3
PSO5	3	2	3	1

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

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						**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	PHY117	Semiconductor Physics	2	1	0	3	
4	EEE112	Principles of Electrical and Electronics Engineering	2	1	0	3	
	OR						
	CHY111	Engineering Chemistry	3	0	2		
5	EVS112	Environmental Studies	3	0	0	3	
	OR						
	HMM111	Human Value & Ethics	2	0	0	2	
Practical/Viva-Voce/Jury							
6	ARP101	Communicative English-1	1	0	2	2	
7	CSP113	Programming for Problem Solving Lab	0	0	2	1	
8	CSP101	Introduction to Computer Science and Engineering	0	0	2	1	
9	MEP106	Computer Aided Design & Drafting	0	0	3	1.5	
	OR						
	MEP105	Mechanical Workshop	0	0	3		
10	EEP112	Principles of Electrical and Electronics Engineering	0	0	2	1	
	OR						
	CHY111	Engineering Chemistry Lab	0	0	2		

11	PHY161/162	Physics Lab –I / Physics Lab-II	0	0	2	1	
TOTAL CREDITS						**23.5/22.5**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						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	MTH145	Probability and Statistics	3	1	0	4	
3	CHY111	Engineering Chemistry	3	0	0	3	
	OR						
	EEE112	Principles of Electrical and Electronics Engineering	2	1	0		
4	HMM111	Human Value & Ethics	2	0	0	3	
	OR						
	EVS112	Environmental Studies	3	0	0	3	
5	PHY116	Engineering Physics	2	1	0	3	
Practical/Viva-Voce/Jury							
6	ARP102	Communicative English -2	1	0	2	2	
7	CSP103	Multimedia Application Lab	0	0	2	1	
8	CSP114	Application based Programming in Python	0	0	2	1	
9	MEP105	Mechanical Workshop	0	0	3	1.5	
	OR						
	MEP106	Computer Aided Design & Drafting	0	0	3		
10	CHY111	Engineering Chemistry	0	0	2	1	
	OR						
	EEP112	Principles of Electrical and Electronics Engineering	0	0	2		
11	PHY161/162	Physics Lab –I / Physics Lab-II	0	0	2	1	
TOTAL CREDITS						**22.5/23.5**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: III	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Re**
			L	**T**	**P**		
THEORY SUBJECTS							
1	BTY223	Introduction to Biology for Engineers	2	0	0	2	
2	CSE242	Data Structures	3	0	0	3	
3	CSE243	Object Oriented Programming Using Java	3	0	0	3	
4	CSE244	Principles of Operating System	3	0	0	3	
5	CSE245	Discrete Structures	3	1	0	4	
6	CSE247	Computer Organization and Architecture	3	0	0	3	
Practical/Viva-Voce/Jury							
7	ARP203	Logical Skills Building and Soft Skills	1	0	2	2	
8	CSP242	Data Structures Lab	0	0	2	1	
9	CSP243	Object Oriented Programming Using Java	0	0	2	1	
10	CSP244	Principles of Operating System Lab	0	0	2	1	
11	CSP297	Project Based Learning (PBL) -1	0	0	2	1	
12	CSP299	Summer Internship-I	-	-	-	1	
TOTAL CREDITS						**25**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: IV	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE248	Computer Networks	3	0	0	3	
2	CSE249	Data Base Management System	3	0	0	3	Discrete Structures
3	INT248	Human computer interaction	3	0	0	3	
4	PE-1	Program Elective-1	3	0	0	3	
	CSE011	Mathematical Techniques					
	CSE012	Introduction to Graph Theory and its Applications					
5	OE1	Open Elective – 1	2	0	0	2	
Practical/Viva-Voce/Jury							
6	CSEP48	Computer Networks Lab	0	0	2	1	
7	CSEP49	Data Base Management System Lab	0	0	2	1	
8	INP248	Human computer interaction	0	0	2	1	
9	ARP204	Quantitative and Qualitative Aptitude Sill Building	1	0	2	2	
10	CSP298	Project Based Learning (PBL) -2	0	0	2	1	PBL-I
TOTAL CREDITS						**20**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: V	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE350	Design and Analysis of Algorithm	3	1	0	4	Data Structure
2	CSE351	Software Engineering and Testing Methodologies	3	0	0	3	
3		Program Elective-2	3	0	0	3	
	CSE021	Introduction to Cloud Computing					
	INT021	Ethical Hacking					
4	OE-2	Open Elective – 2	3	0	0	3	
Practical/Viva-Voce/Jury							
5	ECC001	Community Connect	-	-	-	2	
6	ARP301	Personality Development and Decision making Skills	1	0	2	2	
7	CSP350	Design and Analysis of Algorithm Lab	0	0	2	1	Data Structure Lab
8	CSP395	Technical Skill Enhancement Course-1 Simulation Lab	0	0	2	1	Operating system, Database Management system
9	CSP397	Project Based Learning (PBL) -3	0	0	2	1	PBL-2
10	CSP399	Summer Internship-II	-	-	-	1	Summer Internship-I
TOTAL CREDITS						**21**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: VI	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	HMM305	Management for Engineers	3	0	0	3	
2	CSE352	Web Technologies	2	0	0	2	Java
3	CSE022	Android Application Development	3	0	0	3	
4	PE3	Program Elective-3	3	0	0	3	
	CSE031	Digital Image Processing					
	CSE032	Cryptography and Network Security					
5	PE4	Program Elective-4	3	0	0	3	
	CSE041	Software Project Management					
	CSE042	Software Testing					
6	OE-3	Open Elective – 3	3	0	0	3	
Practical/Viva-Voce/Jury							
7	ARP302	Campus to Corporate	1	0	2	2	
8	CSP352	Web Technologies Lab	0	0	2	1	Java
9	CSE022	Android Application Development	0	0	2	1	Principles of Operating system Lab
10	CSP396	Technical Skill Enhancement Course-2(Application Development Lab)	0	0	2	1	
11	CSP398	Project Based Learning (PBL) -4	0	0	2	1	PBL-3
TOTAL CREDITS						**23**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: VII	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
1	CSE354	Artificial Intelligence	3	0	0	3	
2		Program Elective-5	3	0	0	3	
	CSE051	Wireless Networks					
	CSE052	Risk Management					
3		Program Elective-6	3	0	0	3	
	CSE061	Introduction to Internet of Things					
	CSE062	Mobile Computing					
4		Comprehensive Examination	0	0	0	0	Audit
5	OE4	Open Elective - 4	3	0	0	3	
Practical/Viva-Voce/Jury							
6	CSP354	Artificial Intelligence Lab	0	0	2	1	
7	CSP497	Major Project- 1	-	-	-	3	PBL-4
8	CSP499	Summer Internship-III	-	-	-	1	Summer Internship-II
TOTAL CREDITS						**17**	

School of Engineering and Technology							
B.Tech-Information Technology							
Batch: 2018 Onwards						TERM: VIII	
S. No.	**Course Code**	**Course**	**Teaching Load**			**Credits**	**Pre-Requisite/Co Requisite**
			L	**T**	**P**		
THEORY SUBJECTS							
Practical/Viva-Voce/Jury							
1	CSP498	Major Project - 2	-	-	-	8	Major Project - 1
TOTAL CREDITS						**8**	
		Term	L	T	P	**Credits**	TTH
		TERM-I.	19	3	20	23.5/22.5	42
		TERM-II.	19	3	18	22.5/23.5	40
		TERM-III.	18	1	10	25	29
		TERM-IV.	19	0	20	20	39
		TERM-V.	13	1	8	21	22
		TERM-VI.	18	0	10	23	28
		TERM-VII.	12	0	2	17	14
		TERM-VIII.	-	-	-	8	0
		TOTAL CREDITS				160	

School: SET		**Batch :2019-2013**	
Program: B.Tech		**Current Academic Year: 2019-20**	
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: Create flowchart , algorithm and Pseudo-code CO2: Understanding basic C concept CO3: Implement Array and Functions CO4: Understand and implement Pointers CO5: Apply user-defined data types	
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
	B	Operators and expressions, Types of Statements: Assignment, Control, jumping.	CO2
	C	Control statements: Decisions, Loops, break, continue	CO2
	Unit 3	**Arrays and Functions**	
	A	Arrays: One dimensional and multi dimensional arrays: Declaration, Initialization and array manipulation (sorting, searching).	CO3
	B	Functions: Definition, Declaration/Prototyping and Calling, Types of functions, Parameter passing: Call by value, Call by reference.	CO3

	C	Passing and Returning Arrays from Functions, Recursive Functions.	CO3
	Unit 4	**Pre-processors and Pointers**	
	A	Pre-processors: Types, Directives, Pre-processors Operators (#,##,\) , Macros: Types, Use, predefined Macros	CO4
	B	Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.	CO4
	C	String: Introduction, predefined string functions, Manipulation of text data, Command Line Arguments.	CO4
	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
	B	Files: Introduction, concept of record, I/O Streaming and Buffering, Types of Files: Indexed file, sequential file and random file,	CO5
	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
	Mode of examination	Theory	
	Weightage Distribution	CA / MTE / ETE	
		30% / 20% / 50%	
	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: Create flowchart , algorithm and Pseudo-code	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
2.	CO2: Understanding basic C concept	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
3.	CO3: Implement Array and Functions	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
4.	CO4: Understand and implement Pointers	PO1,PO2,PO3,PO11,PO12

		PSO1,PSO2,PSO3,PSO4,SPO5
5.	CO5: Apply user-defined data types	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

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

	Cos	PO1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO 11	PO12	PS O1	PSO2	PSO3	PSO4	PSO5
CSE113	CO1	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO2	3	2	3	-	-	-	-	-	-	-	2	1	3	2	2	1	2
	CO3	3	2	3	-	-	-	-	-	-	-	1	1	2	3	2	1	2
	CO4	3	2	3	-	-	-	-	-	-	-	3	2	3	2	1	1	1
	CO5	3	2	3	-	-	-	-	-	-	-	3	1	2	2	2	1	3

Term-1

Syllabus: CSP 113: Programming for problem solving Lab

School: SET		**Batch: 2018**	
Program: B.Tech.		**Current Academic Year: 2018-19**	
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: Understand core concept of c Programming CO2: Implement Array and String CO3: Implement Functions CO4: Use Union and Structure CO5: Understand and implement Pointers	
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**
		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**

		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**
		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**
		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**
		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	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*			
	Other References	4. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 5. 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

Syllabus: MTH 142:Calculus And abstract Algebra

School: SET		**Batch: 2019-2023**
Program: B.Tech.		**Current Academic Year: 2019-2020**
Branch: CSE		**Semester: 1**
1	Course Code	**MTH 142**
2	Course Title	**Calculus and Abstract Algebra**
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 prospective engineers with techniques in basic calculus and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.
6	Course Outcomes	CO1: Explain the concept of differential calculus, illustrate thecurvature and Maxima, minima and saddle point. (K2, K3, K4) CO2: Explain the basic concepts matrices and determinate, evaluate system of linear equation by using rank and inverse method. (K2, K3, K5) CO3: Explain the basic concept of sets, relation, functions, groups Rings and Field. (K2, K4) CO4: Discuss the basic of Vector spaces. (K1, K3) CO5: Describe and use the linear transformation and evaluate nullity and kernel. (K1, K2, K3, K5) CO6:Explain the concept of Eigen values and Eigen vectors; evaluate

		the diagonalization of matrices, explain the basic introduction of Inner product spaces.(K2, K3, 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 differential and integral calculus, linear Algebra and Abstract Algebra.	
8	**Outline syllabus: Calculus and Abstract Algebra**		**CO Mapping**
	Unit 1	**Calculus**	
	A	Differentiation, Taylor's and Maclaurin theorems with remainders; indeterminate forms, L' Hospital's rule.	CO1
	B	Maxima and minima, Partial derivatives, Euler's theorem.	CO1
	C	Total derivative. Evaluation of double integration. Applications of double integral (to calculate area).	CO1
	Unit 2	**Matrices**	
	A	Matrices, vectors: addition and scalar multiplication, matrix multiplication.	CO2
	B	Linear systems of equations, linear Independence, rank of a matrix, determinants, Cramer's Rule	CO2
	C	Inverse of a matrix, Gauss elimination and Gauss-Jordan elimination.	CO2
	Unit 3	**Basic Algebra**	
	A	Sets, relations and functions.	CO3
	B	Basics of groups, cyclic groups.	CO3
	C	Subgroups, basics of Rings and Field.	CO3
	Unit 4	**Vector spaces**	
	A	Vector Space, linear dependence of vectors, basis, dimension.	CO4, CO5
	B	Linear transformations (maps), range and kernel of a linear map, rank and nullity.	CO4, CO5
	C	Inverse of a linear transformation, Matrix associated with a linear map.	CO4, CO5
	Unit 5	**Vector spaces (Prerequisite Module 2 –Matrices & Module-4 Vector spaces)**	
	A	Eigenvalues, Eigenvectors	CO6
	B	Symmetric, skew-symmetric, and orthogonal Matrices,	CO6

		Diagonalization			
	C	Basic introduction of Inner product spaces, Gram-Schmidt orthogonalization.			CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002. 2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.			
	Other References	1. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005. 2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008. 3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010. 4. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.			

COURSE OUTCOMES – PROGRAMME OUTCOMES MAPPING TABLE

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C142.1	**3**	**3**	**2**	**2**	**3**	**1**	**-**	**-**	**-**	**1**	**1**	**1**
C142.2	**3**	**3**	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**1**	**1**	**2**
C142.3	**3**	**3**	**2**	**2**	**2**	**1**	**-**	**-**	**-**	**1**	**1**	**1**
C142.4	**3**	**3**	**2**	**2**	**2**	**1**	**-**	**-**	**-**	**1**	**1**	**1**
C142.5	**3**	**3**	**2**	**2**	**2**	**1**	**-**	**-**	**-**	**1**	**1**	**2**
C142.6	**3**	**3**	**2**	**3**	**2**	**2**	**-**	**-**	**-**	**1**	**1**	**2**

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

Syllabus: PHY 117, Semiconductor Physics

School: School of Basic Sciences and Research		**Batch: 2019-2023**
Program: B.TECH .		**Current Academic Year: 2019-2020**
Branch: CSE/EC/EEE		**Semester: II**
1	Course Code	PHY 117
2	Course Title	Semiconductor Physics
3	Credits	3
4	Contact Hours (L-T-P)	2-1-0
	Course Status	Compulsory
5	Course Objective	To make students proverbial with the fundamental concepts of Semiconductors materials and their real life applications for configuring various electronics devices.
6	Course Outcomes	After the completion of this course, CO1: Students will learn the various fundamental theory of materials and concept of solid classification. CO2: 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. CO3: Students will gain knowledge about the formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode etc. CO4: 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, etc. CO5: Students will learn the concept of optical sources: Light emitting diode (construction, basic working principle), semiconductor laser (construction, basic working principle), and optical detectors. 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	**Physics ofSemiconductor**	
	A	Introduction, classical free electron theory (Lorentz-Drude theory and limitations), Quantum theory of free electron	CO1, CO6
	B	(Fermi energy, effect of temperature on Fermi-Dirac distribution) (qualitative analysis)	CO1

	C	Energy bands, Classification of Solids on the basis of energy band.	CO1
	Unit 2	**Transport phenomena in semiconductors**	
	A	Mobility, conductivity, electrons and holes in an intrinsic semiconductors, Donor and Acceptor impurities (n-type and p-type semiconductor)	CO2, CO6
	B	Fermi levels , carrier densities in semiconductor	CO2
	C	Concentration of electrons in conduction band and holes in valence band, Drift and diffusion current, Hall effect.	CO2
	Unit 3	**p-n Junction**	
	A	p-n junction, types of p-n junction (step-graded and Linearly-graded junction)	CO3
	B	formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode	CO3
	C	Avalanche and Zener breakdown, comparison of Zener diode and pn junction diode, concept of tunneling, I-V characteristics of tunnel diode.	CO3, CO6
	Unit 4	**Laser Physics**	
	A	Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation	CO4
	B	population inversion and pumping, active components of laser, optical amplification or gain	CO4
	C	threshold condition for laser action, three and four level lasers, Ruby and He-Ne lasers.	CO4
	Unit 5	**Optoelectronic Devices**	
	A	optical sources: Light emitting diode (construction, basic working principle)**,** semiconductor laser (construction, basic working principle)	CO5
	B	optical detectors: photodiode (working principle), p-i-n photodiode (working principle),	CO5, CO6
	C	Photovoltaic effect, p-n junction solar cell (basic working idea).	CO5, CO6
	Mode of Examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	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 Device Fundamentals- Robert F. Pierret Addison Wesley Longman. 3. Semiconductor Devices- Kanaan Kano, Pearson Education. 4. Basic Electronics by B.L Thareja 5. Principles of Electronics by V.K Mehta	

Schools: SET		Batch : 2019-20 Current Academic Year: 2019-20 Semester: 1st
1	Course Code	**ARP101**
2	Course Title	Communicative English-1
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To minimize the linguistic barriers that emerges in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.
6	Course Outcomes	CO1 Learn to use correct sentence structure and punctuation as well as different parts of speech. CO2 Learning new words its application and usage in different contexts helpful in building meaning conversations and written drafts. Develop over all comprehension ability, interpret it and describe it in writing. Very useful in real life situations and scenarios. CO2 A recognition of one's self and abilities through language learning and personality development training leading up to greater employability chances. Learn to express oneself through writing while also developing positive perception of self. To be able to speak confidently in English CO3 To empower them to capitalise on strengths, overcome weaknesses, exploit opportunities, and counter threats. To ingrain the spirit of Positive attitude in students through a full length feature film followed by a storyboarding activity. Create a Self Brand, identity and self esteem through various interesting and engaging classroom activity CO4 Exposing students to simulataions and situations wherein students learn to describe people and situations and handle such situations effectively and with ease. Teaching students how to engage in meaningful dialogues and active conversational abilities to navigate through challenging situations in life and make effective conversations. CO12 Learn how to transform adverse beginnings into positive endings – through writing activities like story completion.
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal

		expression as a first step towards greater employability.	
8	Outline syllabus – ARP 201		
	Unit A	**Sentence Structure**	**CO Mapping**
	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	
	Unit B	**Vocabulary Building & Punctuation**	
	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO1
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	Unit C	**Writing Skills**	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie | SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film)	CO2, CO3, CO4
	Unit D	**Speaking Skill**	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO2, CO3
	Topic 2	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)	CO3, CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO2, CO4, CO4
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE*	*N/A*
10	Texts & References | Library Links	• Blum, M. Rosen. *How to Build Better Vocabulary*. London: Bloomsbury Publication • Comfort, Jeremy(et.al). *Speaking Effectively*. Cambridge University Press	

Observations:

1. A Single Consolidated Syllabus has now replaced the Previous Functional English Beginners -1 and Functional English Intermediate -1
2. Credits previously allocated to FEN 01 Lab Sessions have been dissolved
3. The Pearson Voice Labs have been completely eliminated

Syllabus: CSP 113: Programming for problem solving Lab

School: SET		**Batch: 2019-2023**			
Program: B.Tech.		**Current Academic Year: 2019-2020**			
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	6. Learn basic programming constructs –data types, decision structures, control structures in C 7. learning logic aptitude programming in c language 8. Developing software in c programming			
6	Course Outcomes	Students will be able to: CO1: Understand core concept of c Programming CO2: Implement Array and String CO3: Implement Functions CO4: Use Union and Structure CO5: Understand and implement Pointers			
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**
		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**
		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**
		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**
		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**
		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	Practical			
	Weightage	CA	MTE	ETE	

	Distribution	60%	0%	40%	
	Text book/s*	Kernighan, Brian, and Dennis Ritchie. *The C Programming Language*			
	Other References	9. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 10. 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	3. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004. 4. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999
Softwares	Turbo C

School: SET		**Batch : 2019-23**	
Program: B.TECH/BCA/BSc		**Current Academic Year: 2019-20**	
Branch: CE		**Semester: I**	
1	Course Code	EVS112	Course Name: Environmental Studies
2	Course Title	Environmental Studies	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Core	
5	Course Objective	This course is aimed to inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level	
6	Course Outcomes	CO1: Acquire the basic knowledge and understanding of problems of environment and need of sustainable development CO2: Understand Importance of ecosystem and need for its conservation CO3: Explore importance of various natural resources available and create awareness for conservation and reduction of exploitation CO4: Assess importance of relationship between human culture, natural resources, biodiversity and need for its conservation CO5: Identify causes and effects of environmental pollution on human and create awareness amongst the society.	
7	Course Description	Introduction, Ecosystem, Natural resources, Biodiversity and Conservation, Pollution	
8	Outline syllabus		CO Mapping/lecture hours
	Unit 1	**Introduction to environmental studies**	**06**
	A	Multidisciplinary nature of environmental studies; Human population and growth;	CO1
	B	Components of environment, Scope and importance	
	C	Concept of sustainability and sustainable development. Environmental ethics	
	Unit 2	**Ecosystem**	**08**
	A	What is ecosystem? Structure and function of ecosystem	CO2
	B	Energy flow in an ecosystem; food chain, food web and ecological succession	
	C	Case study of following ecosystem: forest, grassland, desert, aquatic (pond, stream, lake, river, ocean, estuaries)	
	Unit 3	**Natural Resources: Renewable and non-Renewable resources**	**08**
	A	Land use resources, land degradation, soil erosion; Deforestation (causes and impacts, effects on biodiversity and tribal population	CO3
	B	Water: use and overexploitation surface and ground water, flood, droughts, conflicts over water (international & inter state)	
	C	Heating of earth and circulation of air, air mass formation & precipitation; Energy resources: Renewable, nonrenewable, alternate energy source.	

	Unit 4	**Biodiversity and Conservation**			**09**
	A	Levels of biological diversity: genetic, species and ecosystem diversity.			CO4
	B	Threats to biodiversity; Conservation of biodiversity; natural reserves, wild life conflict.; Disaster management (flood, earthquake, cyclone &landslide)			
	C	Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and informational value. Environmental movements (Chipko, Silent valley, Bishnions of Rajasthan.)			
	Unit 5	**Environmental pollution**			**09**
	A	Environmental pollution: Types, causes, effects and control (air, water, soil, chemical & noise) carbon footprint			CO5
	B	Solid waste management; Environment laws: EPA, Air (pollution control) act, water (pollution control) act, Kyoto protocol, Montreal Protocol, CBD			
	C	Nuclear hazard, climate change, global warming, acid rain, ozone layer depletion.			
	Mode of examination	Theory+ 5 hours of field work			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text Books	1.Environmental Studies: R. Rajagopalan, Oxford University Press 2. Environmental Pollution: Causes, Effects & Control by K.C Agrawal 3. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons. 4. Environmental Studies by Dr. Suresh K Dhameja, Published by : S K Kataria & Sons New Delhi			
	Suggested references	1.Carson,R,2002.*Silent Spring*.Houghton Miffin Harcourt. 2.Groom,Martha J.Grey K.Meffe and Carl Ronald carroll.*Principles of conservation of Biology*. 3.Gleeson,B. and Low,N.1999.*Global Ethics and environment*,London 4.Pepper,I.L.,Gerba,C.P. & Brusseau,M.L.2011*Environment and Pollution Science*.			

CO and PO Mapping

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO.1	1	2	1	-	-	2	3	2	-	-	-	-	1	-	1
CO.2	1	2	2	1	2	2	2	2	-	-	-	1	2	1	-
CO.3	2	2	2	1	2	2	2	2	1	1	-	1	1	1	-
CO.4	2	2	2	1	2	2	2	2	1	1	-	2	1	1	1
CO.5	2	2	3	-	1	2	2	2	1	1	-	2	1	1	1
CVL	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**1**	**1**	**1**

Syllabus: CSP 101:Introduction to Computer Science and Engineering

School: SET		**Batch : 2019-23**	
Program:B.Tech		**Current Academic Year: 2019-20**	
Branch: CSE		**Semester:I**	
1	Course Code	CSP101 | Course Name	
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.	
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	CO2

		Software.			
	B	Hard Computing versus Soft Computing, Data Structures and Algorithms.			
	C	Computer Graphics, Multimedia, Computer Vision.			
	Unit 3	**Computer Networking**			
	A	Introduction to Networking, Various terminologies, Client Server Technology, Web Technology.			CO3
	B	Introduction to data/network security and current trends.			
	C	Concept of Cloud Computing and Virtualization, Real life applications.			
	Unit 4	**Database Management Systems**			
	A	Introduction to DBMS, DBMS versus File System, Relational DBMS.			CO4
	B	Information Processing and Retrieval			
	C	Big Data Analytics & Scientific Computing			
	Unit 5	**Artificial Intelligence**			
	A	Basics of Artificial Intelligence			CO5
	B	Basics of Pattern Recognition			
	C	Basics of Machine Learning			
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	NIL	40%	
	Text book/s*	1. Introduction to Computer, Peter Norton, 7/e, 2017, Tata McGraw Hill Publishing.			
	Other References	2. Foundations of Computer Science, B A Forouzan& F Mosharraf, 2/e, 2008, Delmar Learning.			

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, PSO4
2.	**CO2:**Perceive some knowledge about programming in various applications.	PO1, PO12, PSO1, PSO4
3.	**CO3:** Acquire basic understanding about computer networking and related technology.	PO1, PO2, PO12, PSO2, PSO4
4.	**CO4:**Enhance some fundamental knowledge of DBMS including application areas.	PO1, PO12, PSO2, PSO4
5.	**CO5:** Understand the current trends in computing in discovering wisdom/knowledge and future prediction.	PO1, PO6, PO8, PO12,

		PSO2, PSO4

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
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	-

B.Tech 1st year
Engineering Chemistry
Branches: CS/IT/ECE/EEE
(CHY111)

UNIT-1

Water: Analysis and its treatment

Water and water treatment: Drinking water standards, Water quality parameters and their measurement: pH (alkalinity and acidity – determination by titrimetry), Turbidity, Dissolved Oxygen (DO), biological oxygen demand (BOD), chemical oxygen demand (COD), chloride, fluoride, oil and fats, hardness (definition and expression, estimation of hardness (EDTA method), nutrients (N, P, etc.), nitrate, dissolved metals. Municipal water treatment process - screening, sedimentation, flocculation; Coagulation, Filtration (Slow sand and rapid sand), disinfaction-chlorination.

UNIT-2

Spectroscopic studies of materials

Principles of spectroscopy and selection rules. Electronic spectroscopy: basic principle, 'Lamberts Beer's law,chromophore, effect of conjugation on chromophore and applications, Fluorescenceand its applications in medicine. Basic principle and applications of Nuclear magnetic resonance and magnetic resonance imaging spectroscopy.

UNIT-3

Electrochemistry, energy storage devices and corrosion

Electrochemistry: Redox reactions, Nernst Equation, relation of e.m.f. with thermodynamic functions (ΔH, ΔF and Δ S). Electrochemical cells- Galvanic cells and Concentration cell, electrode potentials and its relevance to oxidation and reduction, measurement of EMF under standard conditions, determination of pH using Hydrogen electrode, primary battery: dry cells, secondary battery: Lead acid accumulator and Li Ion, fuel cells: H_2-O_2.

Corrosion: Types of corrosion, mechanism of Electrochemical corrosion, galvanic corrosion and protection against electrochemicalcorrosion.

UNIT-4

Chemistry of materials: Structure, properties and application of carbon materials such as diamond, graphite, fullerenes, graphene. Liquid crystals: classification, Molecular ordering, identification, polymeric liquid crystals, and application of liquid crystals: displays and thermography. Organic and inorganic semiconductors.Basic concepts of Conducting polymer, types,p-doping, n-doping, comparison with metallic conductors, examples and applications. Biodegradable polymers: Basic information with common examples Polyglycolic acid (PGA), Polyhydroxy butyrate (PHB), Polyhydroxybutyrates-co-beta hydroxyl valerate(PHBV), Polycaprolactone(pcl).

UNIT-5

Nano science and technology

Introduction to nanoscience and technology, lithography, soft lithography,Dip pen nanolithography, CNT's, bio-nanoinformation, application in microelectronics and in memory devices.

Reference books:

(i)University chemistry, by B. H. Mahan
(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwell
(iv)Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
(v) Physical Chemistry, by P. W. Atkins
(vi)Introduction to nanotechnology: C.P poole,Jr. F.J. Owens, willeyinterscience 2003.
(vii)Nanotechnology, science, innovation and opportunity, LE foster, Pearson education 2007.

Syllabus: CSE 114:Application based programming in Python

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: II**	
1	Course Code	CSE114 | Course Name	
2	Course Title	Application Based Programming in Python	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	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. Select decision-making and looping structures in programming. CO2. Apply Modular programming approach using methods and functions. CO3. Show the use of Python lists, tuples and dictionary. CO4. Incorporate object-oriented programming concept in programming. CO5: Use of python packages in different applications.	
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**	
	A	History, Python Environment, Variables, Data Types, Operators.	CO5
	B	**Conditional Statements:** If, If- else, Nested if-else. **Looping:** For, While, Nested loops.	CO1,CO5
	C	**Control Statements:** Break, Continue, And Pass. Comments	CO1,CO5
	Unit 2	**List, Tuple and Dictionaries**	
	A	**Lists and Nested List:** Introduction, Accessing list, Operations, Working with lists, Library Functionand Methods with Lists.	CO3
	B	**Tuple:** Introduction, Accessing tuples, Operations, Working, Library Functions and Methods with Tuples.	CO3
	C	**Dictionaries :**Introduction, Accessing values in dictionaries, Working with dictionaries, Library Functions	CO3
	Unit 3	**Functions and Exception Handling**	
	A	**Functions:** Defining a function, Calling a function,	C02,CO5

		Types of functions, Function Arguments			
	B	Anonymous functions, Global and local variables			C02,CO5
	C	**Exception Handling**: Definition Exception, Exception handling Except clause, Try? finally clause			CO2,CO5
	Unit 4	**OOP and File Handling**			
	A	**OOPs concept** : Class and object, Attributes, Abstraction, Encapsulation, Polymorphism and Inheritance			C04
	B	Static and Final Keyword, Access Modifiers and specifiers, scope of a class			CO4
	C	User Defined Exceptions			CO4
	Unit 5	**Module and Applications**			
	A	**Modules:** Importing module, Math module, Random module			C02,CO5
	B	Matplotlib, Packages			C02,CO5
	C	**Applications: Searching Linear Search, Binary Search. Sorting: Bubble Sort**			C02,CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	3. 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. Apply decision and repetition structures in program design.	PO1,PO5,PO9,PO11,PSO3
2.	CO2. Implement methods and functions to improve readability of programs.	PO1,PO2,PO3,PO4,PO5,PO9,PO11,PSO1, PSO2,PSO3,PSO4,PSO5
3.	CO3. Demonstrate the use of Python lists, tuples and dictionaries	PO1,PO2,PO3,PO4,PO5,PO9,PO11,PSO1, PSO2,PSO3,PSO4,PSO5
4.	CO4. Describe and apply object-oriented programming methodology.	PO1,PO2,PO3,PO4,PO5,PO9,PO11,PSO1, PSO2,PSO3,PSO4,PSO5
5.	CO5. Apply top-down concepts in algorithm design.	PO1PO3,PO4,PO5,PO9,PO11,PSO1, PSO2,PSO3,PSO4,PSO5

6.	CO6. Write Python programs to illustrate concise and efficient algorithms	PO1,PO4,PO5,PO9,PO11,PSO1, PSO2,PSO3,PSO4,PSO5

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

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

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

Syllabus: MTH 145:Probability and Statistics

School: SET		**Batch: 2019-2023**	
Program: B.Tech.		**Current Academic Year: 2019-2020**	
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; evaluatecorrelation 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 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	MTE	ETE	
		30%	20%	50%	
	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
C145.1	3	3	2	2	3	1	-	-	-	1	1	1
C145.2	3	2	3	2	2	2	-	-	-	1	1	2
C145.3	3	3	2	2	2	1	-	-	-	1	1	1
C145.4	3	2	2	2	2	1	-	-	-	1	1	1
C145.5	3	3	2	2	2	1	-	-	-	1	1	2
C145.6	3	3	2	3	2	2	-	-	-	1	1	2

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

Schools: SBS		**Batch :** 2019-2023	
		Current Academic Year: 2019-20	
		Semester: 2nd (Second)	
1	Course Code	**ARP102**	
2	Course Title	Communicative English -2	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
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	**CO1** Move from primary self-assessment to larger goal and vision statement realisation with the help of feature length films as enablers and multimedia as language facilitators. **CO2** To develop a positive attitude through written expression of positive thought process and outlook with the help of writing activities like story completion et al. **CO3** Learn advanced writing skills in English like full length essays et al. **CO4** Master the science of speech and correct pronunciation through the accent-neutralisation program followed by reading sessions applying the lessons learnt.	
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 202		
	Unit A	**Acquiring Vision, Goals and Strategies through Audio-visual Language Texts**	**CO Mapping**
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life	CO1
	Topic 2	12 Angry Men / Ethics & Principles	
	Topic 3	The King's Speech / Mission statement in life | strategies & Action Plans in Life	
	Unit B	**Creative Writing**	
	Topic 1	Story Reconstruction - Positive Thinking	CO2
	Topic 2	Theme based Story Writing - Positive attitude	
	Topic 3	Learning Diary Learning Log – Self-introspection	
	Unit C	**Writing Skills 1**	
	Topic 1	Precis	CO3
	Topic 2	Paraphrasing	
	Topic 3	Essays (Simple essays)	

	Unit D	**MTI Reduction/Neutral Accent through Classroom Sessions & Practice**	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs	CO4
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	
	Topic 3	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress |	
	Unit E	**Gauging MTI Reduction Effectiveness through Free Speech**	
	Topic 1	Jam sessions	*N/A*
	Topic 2	Extempore	
	Topic 3	Situation-based Role Play	
9	Evaluations	*Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE*	*N/A*
10	Texts & References | Library Links	• 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. The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf	

Syllabus: CSP 114:Application based programming in Python Lab

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch:All		**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. Apply decision and repetition structures in program design. CO2. Implement methods and functions to improve readability of programs. CO3. Demonstrate the use of Python lists, tuples and dictionaries CO4. Describe and apply object-oriented programming methodology. CO5. Apply top-down concepts in algorithm design. CO6. Write Python programs to illustrate 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	**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	CO3,CO6
	Unit 3	**Practical related to Functions and Exception Handling**	
		1. Program to implement Exception Handling **2.** Program to use different functions	CO2,CO6
	Unit 4	**Practical related to Object Oriented Programming**	
		Program to use object oriented concepts like inheritance, overloading polymorphism etc. Program for file handling	CO4,CO6
	Unit 5	**Practical related to Modules and Applications**	
		Program to use modules and package Program to implement searching and sorting	CO2,CO5,CO6

	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	4. The Complete Reference Python, Martin C. Brown, McGraw Hill			
	Other References	5. Introduction to computing in problem solving using Python, E Balagurusamy, McGraw Hill 6. Introduction to programming using Python, Y. Daniel Liang, Pearson 7. Mastering Python, Rick Van Hatten, Packet Publishing House 8. Starting out with Python, Tony Gaddis, Pearson			

Syllabus: CSE 247, Computer organization and architecture

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE/IT		**Semester: III**	
1	Course Code	CSE247 Course Name	
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 design of arithmetic and logic unit and implementation of fixedpoint and floating-point arithmetic operations **CO3:**Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes **CO4:**Study the two types of control unit techniques **CO5:**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 subtractionofsignednumbers.	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	CO3, CO4

		language (RTL) specification			
	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	CA	MTE	ETE	
		30%	20%	50%	
	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, PSO5
2.	CO2. Study the design of arithmetic and logic unit and implementation of fixedpoint and floating-point arithmetic operations	PO1, PO2, PO3, PO6, PO12, PSO5
3.	CO3. Understand basic processing unit and organization of simple processor including instruction sets, instruction formats and various addressing modes	PO1, PO2, PO3, PO6, PO12, PSO5
4.	CO4. Study the two types of control unit techniques	PO1, PO2, PO3, PO4, PO6, PO12, PSO4, PSO5
5.	CO5. Describe hierarchical memory systems including cache memories and select appropriate interfacing standards for I/O devices	PO1, PO2, PO3, PO6, PO12, PSO4, PSO5

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	PSO4	PSO5
CSE247	CO1	3	1	1	-	-	2	-	-	-	-	-	2	-	-	-	-	2
	CO2	3	3	3	-	-	3	-	-	-	-	-	3	-	-	-	-	3
	CO3	3	2	3	-	-	2	-	-	-	-	-	3	-	-	-	-	3
	CO4	3	2	2	-	-	1	-	-	-	-	-	3	-	-	-	3	2
	CO5	3	3	3	-	-	2	-	-	-	-	-	3	-	-	-	3	2

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

School: SET		**Batch :** 2019-23	
		Current Academic Year: 2019-20	
		Semester: 3rd	
1	Course Code	**ARP203**	
2	Course Title	Logical Skills Building and Soft Skills	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
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	CO1: *Know Yourself – A proven Student engagement model to assess individual skill level* CO2: *To identify a student's TNI/TNA (Training Need Identification and Analysis) data* CO3: *To make students self-aware | raise self-esteem & effectiveness* CO4: *To build positive thinking in students and reinforce positive attitude building* CO5: *How to build positive emotional competence in students | GOAL Setting and SMART Goals* CO6: *Enhancing LSRW (Listening Speaking Reading Writing) | Verbal Abilities - 1* CO7: *Understanding AMCAT + ELITMUS Study patterns for Quantitative aptitude and Logical | Analytical Reasoning*	
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 203		
	Unit 1	**BELLS (Building Essential Language and Life Skills)**	**CO Mapping**
	A	Subject Verb Agreement | One word substitution, writing well formed sentences, tense, preposition,	*CO1, CO2,*
	B	Idioms, phrases, spotting the errors , root verb error, prefix & suffix	*CO3*
	C	*Know Yourself*: Techniques of Self Awareness | Self Esteem & Effectiveness| Building Positive Attitude | Building Emotional Competence	*CO4, CO5,CO6*
	D	Positive Thinking & Attitude Building | Goal Setting and SMART Goals – Milestone Mapping | Enhancing L S R W G and P (Listening Speaking Reading) | Verbal Abilities - 1	*CO5, CO6*
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Syllogism | Letter Series | Coding, Decoding , Ranking & Their Comparison Level-1	*CO7*

	B	Number Puzzles	*CO7*
	C	Selection Based On Given Conditions	*CO7*
	Unit 3	**Quantitative Aptitude**	
	A	Number Systems Level 1 | Vedic Maths Level-1	*CO7*
	B	Percentage ,Ratio & Proportion | Mensuration - Area & Volume |Algebra	*CO7*
	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*	

BTY223 INTRODUCTION TO BIOLOGY FOR ENGINEERS

1	Course number	**BTY223**	
2	Course Title	**Introduction to Biology for Engineers**	
3	Credits	1	
4	Contact Hours (L-T-P)	2-0-0	
5	Course Objective	To provide a foundation in biotechnology with engineering of living systems and to apply various tools of traditional engineering fields such as mechanical, material, electrical and chemical to understand and solve biomedical and biological problems and harness potential of living systems for the benefit of human mankind.	
6	Course Outcomes	After successfully completion of this course students will be able to: 1. Explain the scope, concepts, and terminology of biotechnology; 2. Investigate and explain current events and advances in biotechnology; 3. Discuss About the interdisciplinary nature of Biotechnology 4. Describe techniques involving the manipulation of DNA 5. Explore career opportunities in biotechnology	
7	Outline syllabus:		
7.01	XXXNNN.A	**Unit A**	**UNIT I: Introduction to Biotechnology**
7.02	XXXNNN.A1	Unit A Topic 1	History and origin of Biotechnology
7.03	XXXNNN.A2	Unit A Topic 2	Traditional and Modern Biotechnology
7.04	XXXNNN.A3	Unit A Topic 3	Important events in history of biotechnology.
7.05	XXXNNN.B	**Unit B**	**UNIT II: Scope of Biotechnology**
7.06	XXXNNN.B1	Unit B Topic 1	Areas of Biotechnology
7.07	XXXNNN.B2	Unit B Topic 2	Medicine and health care
7.08	XXXNNN.B3	Unit B Topic 3	Agriculture and industrial biotechnology
7.09	XXXNNN.C	**Unit C**	**UNIT III: Biotechnology as interdisciplinary science**
7.10	XXXNNN.C1	Unit C Topic 1	Introduction to Bioinformatics and Computational Biology
7.11	XXXNNN.C2	Unit C Topic 2	Role of Biotechnology in maintaining sustainable environment
7.12	XXXNNN.C3	Unit C Topic 3	Basics of Convergence of biotechnology and electronics
7.13	XXXNNN.D	**Unit D**	**UNIT IV: Basics of Gene Technology**
7.14	XXXNNN.D1	Unit D Topic 1	DNA as blue print of life
7.15	XXXNNN.D2	Unit D Topic 2	Introduction to rDNA Technology
7.16	XXXNNN.D3	Unit D Topic 3	Transgenesis and Cisgenesis
7.17	XXXNNN.E	**Unit E**	**UNIT V: Current advances in Biotechnology**
7.18	XXXNNN.E1	Unit E Topic 1	Introduction to Stem cells,
7.19	XXXNNN.E2	Unit E Topic 2	Tissue engineering and
7.20	XXXNNN.E3	Unit E Topic 3	Gene therapy
8	Course Evaluation		

8.1	Course work: 30% marks	
8.11	Attendance	None
8.12	Assignments	5 marks
8.13	Quizzes	20 marks
8.14	Presentations	5 marks
8.15	Any other	None
8.16	MTE	20 marks
8.18	End-term examination: 50 marks	
8.19	References	
8.20	Text book	1. Smith J. E., Biotechnology, 3rd Edition, Cambridge University Press (2006)
8.21	Other References	1. Molecular biology of the Gene (4th Edition),J .D. Watson, N. H. Hopkins, J. W. Roberts,J.A. Steitz and A.M. 2. Ravi, Indu, Baunthiyal, Mamta, Saxena, Jyoti. Advances in Biotechnology, Springer 2014.

Mapping of Outcomes vs. Topics

Outcome no. → Syllabus topic↓	1	2	3	4	5	6	7	8	9
XXXNNN.A	X								
XXXNNN.A1	X								
XXXNNN.A2	X								
XXXNNN.A3	X								
XXXNNN.B		X							
XXXNNN.B1		X							
XXXNNN.B2		X							
XXXNNN.B3		X							
XXXNNN.C			X	X	X				
XXXNNN.C1			X						
XXXNNN.C2				X					
XXXNNN.C3					X				
XXXNNN.D						X	X		
XXXNNN.D1						X			
XXXNNN.D2							X		
XXXNNN.D3							X		
XXXNNN.E								X	X
XXXNNN.E1								X	
XXXNNN.E2									X
XXXNNN.E3									X

Syllabus: CSE242, Data Structures

School: SET		**Batch :**2019-23	
Program: B.Tech.		**Current Academic Year:** 2019-20	
Branch:CSE/IT		**Semester:**III	
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: Implement operation like traversing, insertion, deletion, searching etc. on various data structures. CO2: Evaluate algorithms and data structures in terms of time and memory complexity. CO3 Understand the application of linear data structure(s) to solve various problems CO4: Understand the application of non linear data structure(s) to solve various problems. CO5: Implement and know when to apply standard algorithms for searching and sorting. 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**	
	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,	CO1

		Fibonacci Series.			
	C	Arrays: Implementation of One Dimensional Arrays, Multidimensional Arrays, Pointer 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
	B	Implementation and Analysis- Bubble Sort, Insertion Sort, Selection Sort, Tree sort			CO5
	C	Hashing: Concepts and Applications, Hash Functions, Collisions, Methods of Resolving Collisions			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	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.	Handle operation like traversing, insertion, deletion, searching etc. on various data structures.	PO1, PO3, PSO3
2.	Evaluate algorithms and data structures in terms of time and memory complexity.	PO1, PO2, PO3, PSO1, PSO2
3.	Understand the application of linear data structure(s) to solve various problems	PO2, PO3, PO4, PO9, PSO1, PSO2
4.	Understand the application of non linear data structure(s) to solve various problems.	PO3, PO9, PSO1, PSO2
5.	Implement and know when to apply standard algorithms for searching and sorting.	PO1, PO2, PO9, PSO1,PSO3
6.	Choose the most appropriate data structure(s) for a given problem	PO1, PO2, PO4, PO9, PSO1

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	PSO 4	PSO 5
CSE 242	Data Structures Using C																	
	CO1	2		1										2		1		
	CO2		2		1					2				3	1			
	CO3	3	3	2						3					3			
	CO4	3	3	2	3					3					3			
	CO5		1	2												2		
	CO6			3	3	2										3		

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

Syllabus: CSE 243, Object Oriented Programming Using JAVA

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch:CSE		**Semester:III**	
1	Course Code	CSE243	Course Name
2	Course Title	Object Oriented Programming Using JAVA	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	**1.**GainknowledgeaboutbasicJavalanguagesyntaxandsemanticstowrite Javaprograms anduse concepts such as variables, conditional and iterative execution methods etc. **2.** Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. **3.** Understand the principles of inheritance, packages and interfaces.	
6	Course Outcomes	Students will be able to: CO1. Identify classes, objects, members of a class and relationships among them needed for a specific problem. CO2. Write Java programs using OOP principles and demonstrate the concepts of polymorphism and inheritance CO3.Create Java programs to implement error-handling techniques using exception handling. CO4. Construct a professional looking package for business project using java doc.	
7	Course Description	Basic *Object Oriented Programming* (*OOP*) concepts, including objects, *classes*, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations *using Java* are discussed.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Object Oriented Paradigm**	
	A	History, The meaning of Object Orientation, Features of Java, OOPs concepts object identity,	CO1, CO2
	B	Encapsulation, information hiding, polymorphism inheritance Java virtual machine,	CO1, CO2
	C	Byte Code, Architecture of JVM, Class Loader Execution Engine, Garbage collection.	CO1, CO2,CO3
	Unit 2	**Introduction to Java**	
	A	Java development Kit(JDK),Introduction to IDE for java development, Setting java environment(steps for path and CLASSPATH setting).	CO1, CO2,CO4
	B	Constants, Variables, Data Types, Operators, Expressions.	CO1, CO2,CO4
	C	Decision Making Branching, Loops, command line	CO1, CO2,CO4

		argument.			
	Unit 3	**Class & Object**			
	A	Arrays, Type conversion & casting, Input from keyboard, Classes Objects.			CO1,CO2,CO3
	B	Methods Method overloading, Constructors, Constructors overloading.			CO1,CO2,CO3
	C	static keyword, Introducing Access Control, String handling.			CO4,CO2
	Unit 4	**Inheritance, package and Interface Inheritance Implementation**			
	A	Multilevel Hierarchy, Overriding methods, Polymorphism, use of this and super, Constructor call in inheritance Abstract class and method,			CO1,CO2,CO3
	B	Final class, method and variable, Implementing Interface, Concept of multiple inheritance in Java, Wrapper class			CO1,CO2,CO3
	C	Packages: User defined packages, built-in packages (java.lang package), Access modifiers.			CO1,CO2,CO3
	Unit 5	**Exception and Multithreading**			
	A	Input/output: Exploring java.io, File,StreamClassesByte Stream Classes and Character stream Classes,.			CO1,CO2,CO3
	B	reading and writing in file, Introduction to Exception Handling, Introduction to try, catch, Finally , throw and throws, Checked and Unchecked exceptions, User define exception			CO1,CO2,CO3
	C	Java's Built-in Exception Chained Exception, Introduction to Multithreading: Creating thread using Runnable interface and Thread class, Thread life cycle, Thread priorities, sleep method.			CO1,CO2,CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	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.	CO1. Identify classes, objects, members of a class and relationships among them needed for a specific problem.	PO1,PO2,PO3,PO4,PSO1
2.	CO2:WriteJavaapplicationprogramsusingOOPprinciplesandproperDe	PO1, PO3, PO4,

	monstrate the concepts of polymorphism and inheritance	PSO2
3.	CO3. How to test, document and prepare a professional looking package for each business project using java doc.	PO1,PO2,PO3,PO4
4.	CO3. Write Java programs to implement error handling techniques using exception handling.	PO9, PO10,PO11, PSO5

PO and PSO mapping with level of strength for Course Name Object Oriented Programming using JAVA (Course code CSE 243)

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	PSO 4	PSO 5
CO 1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO 2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO 3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO 4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

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

Syllabus: CSP 242, Data Structure Lab

School: SET		**Batch: 2019-2023**	
Program: B.Tech.		**Current Academic Year: 2019-2020**	
Branch: CSE/IT		**Semester: III**	
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 basicconcepts 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: Handle operation like traversing, insertion, deletion, searching etc. on various data structures. CO2 Implement the application of linear data structure(s) to solve various problems CO3: Implement the application of non linear data structure(s) to solve various problems. CO4: Implement and know when to apply standard algorithms for searching and sorting. CO5: 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	**CO3**

		Linked list			
		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	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	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			

Syllabus: CSP 243, Object Oriented Programming Using JAVA Lab

School: SET		**Batch: 2019-2023**			
Program: B.Tech		**Current Academic Year: 2019-2020**			
Branch:CSE		**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			
5	Course Objective	1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. 2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. 3. Understand the principles of inheritance, packages and interfaces.			
6	Course Outcomes	Students will be able to: CO1. Identify classes, objects, members of a class and relationships among them needed for a specific problem. CO2. Write Java application programs using OOP principles and proper Demonstrate the concepts of polymorphism and inheritance CO3. Write Java programs to implement error handling techniques using exception handling. CO4. How to test, document and prepare a professional looking package for each business project using javadoc.			
7	Course Description	Basic Object Oriented Programming (OOP) concepts, including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations using Java are discussed.			
8	Outline syllabus				CO Mapping
	Unit 1	**Practical based on classes and objects**			CO1,CO2
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 2	**Practical based on constructors**			CO1,CO2
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 3	**Practical based on inheritance and package**			CO2, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 4	**Practical based on Polymorphism**			CO1, CO2
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 5	**Practical based on Exception handling**			CO1, CO3
		Sub unit - a, b and c detailed in Instructional Plan			
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	1.Schildt H, “The Complete Reference JAVA2”, TMH			
	Other	1. Balagurusamy E, “Programming in JAVA”,			

	References	TMH 2.ProfessionalJavaProgramming:BrettSpell,WROX Publication	

Syllabus: CSP 297, Project Based Learning -1

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE / IT		**Semester: 3rd**	
1	Course Code	**CSP297** Course Name: Project Based Learning -1	
2	Course Title	Project Based Learning -1	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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: Acquire practical knowledge within the chosen area of technology for project development CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach CO3: Discuss and accumulate the background information CO4: Develop effective communication skills for presentation of project related activities CO5: Contribute as an individual or in a team in development of technical projects CO6: Prepare a technical report based on the project.	
7	Course Description	In PBL-1, the students will learn how to define the problem for developing projects, identifying the skills required to develop 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.	CO1, CO2
	Unit 2	Finalizing the problem statement, resource requirement, if any and design of the proposed project. Develop a block diagram and flowchart of proposed system algorithm.	CO1, CO2
	Unit 3	Implementation work under the guidance of a faculty member and obtain the appropriate results.	CO1, CO2, CO3
	Unit 4	Demonstrate and execute Project with the team.	CO3, CO4
	Unit 5	The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.	CO4, CO5, CO6
		Report should include Abstract, Introduction, Proposed System Design/Algorithm, Experimentation & Result Analysis, Conclusion, and References. Presentation – PBL-1	

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Acquire practical knowledge within the chosen area of technology for project development	PO1, PO2, PO4, PO9, PO10, PO11, PO12
2.	CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: Discuss and accumulate the background information	PO1, PO2, PO5, PO9, PO10, PO11, PO12
4.	CO4: Develop effective communication skills for presentation of project related activities	PO1, PO2, PO6, PO9, PO10, PO11, PO12
5.	CO5: Contribute as an individual or in a team in development of technical projects	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
6.	CO6: Prepare a technical report based on the project.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

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

	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CSE297	CO1	3	3	-	3	-	-	-	-	3	3	2	3
	CO2	3	2	-	3	-	-	2	-	3	3	2	3
	CO3	3	2	-	-	2	-	-	-	3	3	2	3
	CO4	3	3	-	-	-	2	-	-	3	3	2	3
	CO4	3	3	2	2	2	2	3	3	3	3	2	3
	CO4	3	3	2	2	2	2	3	3	3	3	2	3

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

Syllabus: CSP 299, Summer Internship-1

School: SET		**Batch: 2019-2023**	
Program:B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester:III**	
1	Course Code	CSP299 Course Name	
2	Course Title	Summer Internship-1	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-0	
	Course Status	UG	
5	Course Objective	1. Acquire knowledge of the industry in which the internship is done. 2. Apply knowledge and skills learned in the classroom in a work setting. 3. To decide the future application areas of Computer Science and Engineering.	
6	Course Outcomes	CO1. An ability to apply knowledge of mathematics, science, and engineering CO2. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability CO3. An ability to function on multidisciplinary teams CO4. An ability to identify, formulate, and solve engineering problems CO5. An understanding of professional and ethical responsibility CO6. Understanding the impact of engineering solutions in a global, economic, environmental, and societal context	
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.	
8	Outline syllabus		CO Mapping
	Unit 1	Submission of Internship Proposal to be approved by academic advisor. For that students will select the company and field, ideally at the end of the first year.	CO1
	Unit 2	The Student will submit the work plan approved by the supervising faculty at the university and the internship supervisor for the organisation offering the internship.	CO2

	Unit 3	The student will do project implementation during Internship under the guidance of the Program Director of the Host Organization. it will be further supervised by faculty members at the University. This activity must guarantee continuous presence and continuity to activities related to project.			CO3,CO4
	Unit 4	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
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	NIL	40%	
	Text book/s*	NA			
	Other References	NA			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. An ability to apply knowledge of mathematics, science, and engineering	PO1, PO2, PO12, PSO4
2.	CO2. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	PO1, PO12, PSO1, PSO4
3.	CO3. An ability to function on multidisciplinary teams	PO1, PO2, PO12, PSO2, PSO4
4.	CO4. An ability to identify, formulate, and solve engineering problem.	PO1, PO12, PSO2, PSO4
5.	CO5. An understanding of professional and ethical responsibility.	PO1, PO6, PO8, PO12, PSO2, PSO4

PO and PSO mapping with level of strength for Industrial Internship(Course Code CSP 299)

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	PSO 3	PSO 4	PSO 5
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	-

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

Syllabus: CSE 244, Principles of Operating System

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: IV**	
1	Course Code	**CSE 244** | Course Name: Principles of 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:**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.	
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
	B	Paging, Segmentation			CO1,CO2,CO3
	C	Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU)			CO1,CO2,CO3
	Unit 5	**INPUT-OUTPUT Management**			
	A	Input –Output interface, Modes of data transfer(Programmed, interrupt and DMA)			CO1,CO2,CO3
	B	Disk structure , Disk scheduling(FCFS,SSTF, SCAN, LOOK,C-SCAN, C-LOOK)			CO1,CO2,CO3,CO4
	C	File Concept ,File operations, File Directories, Case study of Windows Operating System			CO1,CO2,CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	2. 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, PSO5

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

CSE244	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
	CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
	CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
	CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

Syllabus: CSE 248, Computer Networks

School: SET		**Batch: 2019-2023**	
Program: B.tech		**Current Academic Year: 2019-2020**	
Branch:CSE		**Semester: 4**	
1	Course Code	CSE248 | Course Name: B. Tech	
2	Course Title	**Computer Networks**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Compulsory	
5	Course Objective	1. Provide students with an overview of networking 2. Gain insight into the issues, challenges and work at all level of reference models 3. Provide the students with practice on applying network design 4. Enhance students communication and problem solving skills	
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, IP addressing, access control, flow and congestion control **CO3:**Have a basic knowledge of the use ofcryptography and network security; **CO4:**Understand and analyze working of various routing 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	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 –Goback 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,CO2
	B	Routing, optimality Principle Routing protocols-, Shortest path, flooding, distance vector routing , link state routing	CO1,CO2,CO4
	C	Congestion control-Leaky bucket , Token Bucket, jitter control	CO1,CO2

	Unit 4	**Transport Layer**			
	A	Need of transport layer with its services, Quality of service, connection oriented and connection less			CO1,CO2
	B	Transmission Control Protocol: Segment structure and header format, TCP Connection Management, Flow Control			CO1,CO2
	C	TCP congestion control, Internet Congestion Control Algorithm, Overview of User Datagram Protocol (UDP)			CO1,CO2
	Unit 5	**Application Layer**			
	A	Domain Name System (DNS), HTTP, FTP, SMTP			CO1,CO2
	B	Network Security services, cryptography, Symmetric versus Asymmetric cryptographic algorithms- DES, and RSA			CO1,CO2,CO3
	C	Application of Security in Networks: Digital signature			CO1,CO2,CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	9. 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	PO11,PO12,PSO2,PSO3,PSO4
2.	**CO2:**Investigate and explore fundamental issues driving network design	PO1,PO3,PO4,PO5,PO7,PO10,PO11PO12,PSO4
3.	**CO3:**Have a basic knowledge of the use of cryptography and network security;	PO1,PO2,PO4,PO6,PO7,PO8,PO10,PSO1,PSO3
4.	**CO4:**Understand and analyze working of various routing algorithms	PO2,PO7,PSO2,PSO3

CSE248	Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
	CO1	-	-	-	-	-	-	-	-	-	-	1	3	-	2	3	1	-
	CO2	3	-	3	3	2	-	3	-	-	3	1	2	-	-	-	1	-
	CO3	2	3	-	2	-	2	3	2	-	2	-	-	1	-	3	-	-
	CO4	-	2	-	-	-	-	1	-	-	-	-	-	-	1	3	-	-

Syllabus: CSE 249, Database Management System

School:		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: IV**	
1	Course Code	CSE249 Course Name	
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: 1. Apply the knowledge of databases to E-R modelling. 2. Apply the concept of Relational Database model to databasedesign. 3. Learn and apply Structured Query Language (SQL) for data definition and data manipulation. 4.Design a normalized databaseand able to perform transaction management and concurrency control.	
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 ofof DBMS, Characteristic of DBMS, Data Models, Database languages, Database Administrator, Database Users.	CO1
	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
	C	Strong Entity, Weak entity, Specialization and generalization, converting ER Model to relational tables.	CO1,CO2
	Unit 2	**Relational Database Language and Interfaces:**	
	A	Relational data model concepts ,Concept of keys, Mapping Constraints	CO3,CO2
	B	Null Values, Domain Constraints, Referential Integrity Constraints	CO3,CO2
	C	Unary Relational Operations: SELECT and PROJECT Relational Algebra Operations from Set Theory ,Binary Relational Operations: JOIN and DIVISION ,SQL.	CO3,CO2
	Unit 3	**Normalization in Design of Databases:**	
	A	Functional Dependency, Different anomalies in designing a Database, Normalization first	CO4,CO2

	B	second and third normal forms, BoyceCodd normal form, multi-valued dependencies			CO4,CO2
	C	fourth normal forms, Inclusion dependencies, loss less join decompositions			CO4,CO2
	Unit 4	**Transaction Management:**			
	A	Transaction processing system, schedule and recoverability, Testing of serializability,			CO4,CO2
	B	Serializability of schedules, conflict & view serializable schedule			CO4,CO2
	C	Recovery from transaction failures, deadlock handling.			CO4,CO2
	Unit 5	**Concurrency Control**			
	A	Two-Phase Locking Techniques for Concurrency Control , Concurrency Control Based on Timestamp Ordering			CO4,CO2
	B	Multiversion Concurrency Control Techniques ,Validation (Optimistic) Concurrency Control Techniques			CO4,CO2
	C	Granularity of Data Items and Multiple Granularity Locking			CO4,CO2
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	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. 3.Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education. 4.Date C.J., An Introduction to Database Systems, Addison Wesley.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:**Apply the knowledge of databases to E-R modelling.	PO1,PO2,PO3,PO10,PSO12,PSO3
2.	**CO2:**Apply the concept of Relational Database model to databasedesign.	PO1, PO2, PO3, PS5,PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3,PSO5
3.	**CO3:** Learn and apply Structured Query Language (SQL) for data definition and data manipulation.	PO1,PO2,PO3,PO5,PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3PSO5
4.	**CO4:**Design a normalized databaseand able to perform transaction management and concurrency control.	PO1, PO2,PO3, PO4,PO5,PO9,PO10,PO11,PO12,PSO1,PSO2,PSO3, PSO4,PSO5

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	PSO4	PSO5
CO1	2	1	1	-	-	-	-	-	-	3	-	2	-	-	1	-	-
CO2	3	3	3		3	-	-	-	2	3	2	1	3	3	3	-	3
CO3	3	3	3	-	3	-	-	-	3	1	3	3	2	2	3	--	3
CO4	3	3	3	2	3	-	-	-	3	1	3	3	3	3	3	2	3

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

Syllabus: INT248, Human Computer Interaction

School: SET		**Batch : 2018**	
Program:B.Tech		**Current Academic Year:**	
Branch:IT		**Semester:V**	
1	Course Code	INT 248	Course Name
2	Course Title	Human Computer Interaction	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	UG	
5	Course Objective	1. Understand fundamental design and evaluation methodologies of human computer interaction. 2. Demonstrate knowledge of human computer interaction design concepts and related methodologies. 3. Apply theories and concepts associated with effective work design to real-world application.	
6	Course Outcomes	CO1: Explain the capabilities of both humans and computers from the viewpoint of human information processing. CO2: Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms. CO3: Describe and use HCI design principles, standards and guidelines. CO4: Understand the fundamental aspects of designing and evaluating interfaces. CO5:Analyse and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems. CO6:Practic a variety of simple methods for evaluating the quality of a user interface.	
7	Course Description	Students will learn the fundamental concepts of human-computer interaction and user centered design thinking, through working in teams on an interaction design project, supported by lectures, readings, and discussions. They will learn to evaluate and design usable and appropriate software based on psychological, social, and technical analysis. They will become familiar with the variety of design and evaluation methods used in interaction design.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	HCI Introduction, CHI, MMI, Human System Interaction, User Friendliness, Interaction	CO1
	B	Techniques and Tasks, Basic Interaction Tasks, Composite Interaction Task, Interaction Styles, Speech Recognition, Natural Language Processing, Fields of HCI,	CO1
	C	The Contents of Human-Computer Interaction, Nature of Human-Computer Interaction, HCI Application Areas, Goals and Aspects of HCI, HCI Groups.	CO1
	Unit 2	**Interfaces**	
	A	Term Interface, Good and Bad Interfaces, Features of a Good Interface,	CO2

	B	User interface, Quality of User Interface, Types of User Interfaces, Command Line Interface, Advantages of Command Line Interface, Graphical User Interface			CO2
	C	Document Interfaces and their types, Single Document Interface (SDI), Multiple Document Interface (MDI), Tabbed Document Interface.			CO2
	Unit 3	**Interface Design**			
	A	WIMP, Different Expansions,			CO3
	B	GUI vs. WIMP, Interaction Paradigms, Hypertext, Hypermedia, Hyperlink, URL, www, Web-browser.			CO3
	C	Eight golden rules of user interface design, Principles of user interface design			CO3
	Unit 4	**Design Models and Ergonomics**			
	A	User interface models, User interface design methodologies, Efficacy of user interface design, Dialogue box design, Development and evaluation of user interface design, user centered design.			CO4
	B	Factors in user interface design, HCI design models, Process of interface analysis,			CO4
	C	User documentation, Ergonomics introduction, Human factors, Physical issues in ergonomics. cognitive issues in ergonomic			CO4
	Unit 5	**Usability**			
	A	Usability introduction & its need, usability acceptability,			CO5
	B	What to measure in Usability. Usability Engineering,			CO5
	C	Life cycle, how to achieve high usability, Usability evaluation and testing, Learnability, Flexibility.			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	5. Alan Dix, Janet Finlay, Gregory Abowd. Ruel Beale "Human Computer Interaction". pHI.			
	Other References	1. Rajiendra Kumar, " Human Computer Interaction" Second Edition, Firewall Media New Delhi. 2. Ben Shneiderman, "Design the User Interface: Strategies for Effective Human-Computer Interaction" Pearson Education.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Explain the capabilities of both humans and computers from the viewpoint of human information processing.	PO1,PO2,PO3,PO4,PSO1
2.	CO2: Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.	PO1, PO3, PO4, PSO2
3.	CO3: Describe and use HCI design principles, standards and guidelines.	PO1,PO2,PO3,PO4

4.	CO4: Understand the fundamental aspects of designing and evaluating interfaces.	PO3, PO4, PSO2
5.	CO5: Analyse and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.	PO9, PO10,PO11, PSO5
6	CO6: Practice a variety of simple methods for evaluating the quality of a user interface.	PO1,PO4,PSO1

PO and PSO mapping with level of strength for Course Name Human Computer Interaction

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	PSO 4	PSO 5
CO 1	3	3	3	3	--	--	--	1	1	1	-	1	3	2	2	1	2
CO 2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO 3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO 4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3
CO 5	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO 6	3	2	1	3	1	1	-	-	-	-	-	-	3	-	-	1	1

Syllabus: INP248, Human Computer Interaction Lab

School: SET		**Batch: 2018-2022**	
Program: B.Tech		**Current Academic Year: 2018**	
Branch: IT		**Semester: V**	
1	Course Code	INP 248	
2	Course Title	Human Computer Interaction Lab	
3	Credits	2	
4	Contact Hours (L-T-P)	3-0-2	
	Course Status	Compulsory	
5	Course Objective	The objective is to gain knowledge of basic concepts of Human computer Interaction	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1. Identify the basic components of data acquisition on machines. CO2. Understand the working of data analysis and segmentation techniques.. CO3. Analyze the process of data communication between computers. CO4. Develop some application oriented projects on Image Processing, Voice Analysis, Natural Language Processing etc CO5. Identify how to use MATLAB for industry oriented human computer interaction projects.	
7	Course Description	Human Computer Interaction Lab covers the hands-on, understanding and analysis of data acquisition, analysis and communication on computers.	
8	Outline syllabus		CO Mapping
	Unit 1	**Data Acquisition on Computer**	
		3. **To deploy various data acquisition techniques on computers including text, images, data from url etc**	CO1
	Unit 2	**Data Analysis on Computer**	
		1. Develop a computer interaction model to numerically extract the required part of images. **2. Develop a computer interaction model to numerically extract the required part of text.** **3. Develop a computer interaction model to numerically extract the required part of data from url.**	CO2
	Unit 3	**Data Interfacing between computers**	
		1. Communicate some text, images and .dat from a machine to another machine. **2. Intercommunicate between machines in a parallel computing environment.**	CO3
	Unit 4	**Application Oriented Experiments**	
		1. **Develop a video to frame conversion model and revert the process with encrypted frames.** 2. **Reduction in redundancy of a standard dataset.**	CO4
	Unit 5	**Industry Oriented Experiments**	
		1. Use MATLAB for facial features identification from the real captured images through webcam. **2. Use MATLAB for voice features identification from the real captured sound through**	CO5

		microphone.			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	6. Alan Dix, Janet Finlay, Gregory Abowd. Ruel Beale "Human Computer Interaction". pHI.			
	Other References	1. Rajiendra Kumar, " Human Computer Interaction" Second Edition, Firewall Media New Delhi. 2. Ben Shneiderman, "Design the User Interface: Strategies for Effective Human-Computer Interaction" Pearson Education.			

Syllabus: CSP 244, Principles of Operating System Lab

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**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, file operations and 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
	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
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	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

1	Course Code	CSE245
2	Course Title	Discrete Structures
3	Credits	4
4	Contact Hours	3-1-0
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. ***Know*** 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. ***Use*** algebraic structures to construct models and prove. CO-4. ***Analyze*** basic principles of Boolean algebra with mathematical description. CO-5. ***Integrate*** Permutations and combinations in counting techniques and applications of Graph Theory. CO-6. ***Support*** ability to describe computer programs in a formal mathematical manner.
7	**Prerequisite**	Concepts of algebra
8	**Course Contents**	
8.01	Unit A	**Introduction to Set Theory, Relations and Functions.**
8.02	Unit A Topic 1	Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set Identities.
8.03	Unit A Topic 2	Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.
8.04	Unit A Topic 3	Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.
8.05	Unit B	**Logics and Mathematical Induction**
8.06	Unit B Topic 1	Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference, Natural Deduction.
8.07	Unit B Topic 2	Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.
8.08	Unit B Topic 3	Natural Numbers: Introduction, Mathematical Induction, Variants of Induction, Induction with Nonzero Base cases.
8.09	Unit C	**Algebraic Structures**
8.10	Unit C Topic 1	Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups,
8.11	Unit C Topic 2	Homomorphism's, Definition and elementary properties of Rings and Fields, Integers Modulo n.
8.12	Unit C Topic 3	Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram.
8.13	Unit D	**Lattices and Applications**
8.14	Unit D Topic 1	Definition, Properties of lattices – Bounded, Complemented, Modular and Complete Lattice, Morphisms of lattices.
8.15	Unit D Topic 2	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.
8.16	Unit D Topic 3	Recurrence Relation & Generating function: Recursive definition of functions, Recursive algorithms, Method of solving recurrences.
8.17	Unit E	**Graph Theory and Applications.**
8.18	Unit E Topic 1	Trees: Definition, Binary tree, Binary tree traversal, Binary search tree.
8.19	Unit E Topic 2	Graphs: Definition and terminology, Representation of graphs, Multi graphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph colouring.
8.20	Unit E Topic 3	Combinatorics: Introduction, Counting Techniques, Pigeonhole Principle
9	**Course Evaluation: Continuous Assessment-30 Marks**	
9.1	Attendance	--
9.2	Homework	2 assignments, no weight
9.3	Quizzes	7 best quizzes (based on assignments) - 15 marks
9.4	Project	15
9.5	Any other	NO
9.6	**Mid Term Examination**	**20 Marks**
9.7	**End Term Examination**	**50 Marks**
10	**Reading Content**	
10.1	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.*
10.2	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*

PO and PSO mapping with level of strength Discrete Structures for Computer Science (CSE)

Syllabus: CSP 249, Database management System Lab

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch:CSE		**Semester: IV**	
1	Course Code	CSP246	
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: Understandthe 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	
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	CO1,CO2
	Unit 3	**DML commands and Aggregate functions**	
		Introduction about the INSERT, SELECT , UPDATE & DELETE command.,sum,avg,count,max,min	CO2,CO4
	Unit 4	**Practical based on Grouping Clauses GROUP BY ORDER BY & GROUP BY HAVING**	CO1,CO4
		Briefly explain Group by, order by ,having clauses with examples.	
	Unit 5	**Practical based on Sub- queries, JOINS**	CO1,CO4
		Related example of Sub- queries, Joins and related examples	
	Mode of examination	Jury/Practical/Viva	

	Weightage Distribution	CA	MTE	ETE	
		60%	0%	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.			

School: SET		**Batch :2018**	
Program: B.TECH		**Current Academic Year:**	
Branch:CSE		**Semester: VI**	
1	Course Code	INT021	Course Name B. Tech
2	Course Title	**Ethical Hacking**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status		
5	Course Objective	5. Students will learn fundamentals of ethical hacking via lectures and assignments. 6. Students will investigate various problem and regulation of ethical hacking through projects and assignments.	
6	Course Outcomes	Students will be able to: **CO1:**Describe and understand the basics of the ethical hacking **CO2:**Perform the foot printing and scanning **CO3:** Demonstrate the techniques for system hacking **CO4:**Characterize the malware and their attacks and detect and prevent them	
7	Course Description	This course aims to introduce students to the fundamental concepts and techniques in ethical hacking, and giving students an overview of attack and securing methods	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Ethical Hacking**	
	A	Security Fundamental, Security testing, Hacker and Cracker, Descriptions	CO1, CO2
	B	Test Plans-keeping It legal, Ethical and Legality	CO1, CO2
	C	The Attacker's Process, The Ethical Hacker's Process, Security and the Stack	CO1, CO2
	Unit 2	**Footprinting and scanning**	
	A	Information Gathering, Determining the Network Range, Identifying Active Machines	CO1, CO2, CO3
	B	Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack Surface	CO1, CO2, CO3
	C	Enumeration, System Hacking	CO1, CO2, CO3
	Unit 3	**Malware Threats**	
	A	Viruses and Worms, Trojans, Covert Communication	CO2, CO3
	B	Keystroke Logging and Spyware, Malware Counter measures	CO2, CO3
	C	Sniffers, Session Hijacking, Denial of Service and Distributed, Denial of Service	CO2, CO3,CO4
	Unit 4	**Web Server Hacking**	
	A	Web Server Hacking, Web Application Hacking	CO1, CO2

	B	Database Hacking			CO4
	C	Wireless Technologies, Mobile Device Operation and Security, Wireless LANs			CO1, CO2,CO4
	Unit 5	**IDS, Firewalls and Honeypots**			
	A	Intrusion Detection Systems, Firewalls, Honeypots			CO2,CO3
	B	Physical Security, Social Engineering			CO3,CO1
	C	Case Studies			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Certified Ethical Hacker, Version 9, Second Edition, Michael Gregg, Pearson IT Certification 2. Hacking the Hacker, Roger Grimes, Wiley 3. The Unofficial Guide to Ethical Hacking, Ankit Fadia, Premier Press			
	Other References	1. ISO/IEC 27001:2013			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:**Describe and understand the basics of the ethical hacking	PO1,PO2,PO3,PO4,PO5, PO7.PSO1,PS04
2.	**CO2:**Perform the foot printing and scanning	PO1, PO3, PO4,PO8, PO9, PSO2
3.	**CO3:** Demonstrate the techniques for system hacking	PO1,PO2,PO3,PO4,PO5, PO7.PSO1,PS04
4.	**CO4:**Characterize the malware and their attacks and detect and prevent them	PO9, PO10,PO11, PSO3

PO and PSO mapping with level of strength for Course Name Ethical Hacking Fundamentals (Course Code CSC302)

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

School: SET		Batch : 2019-23 Current Academic Year: 2019-20 Semester: 4th	
1	Course Code	**ARP204**	
2	Course Title	Quantitate and Qualitative Aptitude Sill Building	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
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	CO1: *Learn what is VMOSA (Vision, Mission, Values and Ethics) Communication Process* CO2: *Communication Styles and flexing and 4 social styles of communication* CO3: *Understand Listening Skills and Listening Styles* CO4: *Understanding the Art of giving feedback and probing* CO5: *Business writing skills and non-verbal communication* CO6: *MTI Reduction Program | Verbal Abilities - 2* CO7: *2nd Level proficiency in Quant & Aptitude Reasoning abilities*	
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 – ARP204		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 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 - Sentence Arrangements, Correction Analogies| The Art of Giving Feedbacks| Feedback Skills | Asking fact finding questions- Probing Skills	CO2, CO3,CO4
	C	Email Etiquette | Business Writing Skills| Telephone Etiquette Skills (Telephone Handling Skills) | Non Verbal Communication-Kinesics, Proxemics, Paralanguage | MTI Reduction Program | Verbal Abilities - 2	CO5, CO6
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Coding Decoding , Ranking & Their Comparison Level-2	CO7
	B	Series, Blood Relations & Number Puzzle	CO7
	Unit 3	**Quantitative Aptitude**	
	A	Number System Level 2	CO7
	B	Vedic Maths Level-2 | Probability | Permutation & Combination	CO7
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest	CO7

	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*	

Syllabus: CSE 011, Mathematical Techniques (Program Elective-1)

School: SET		**Batch: 2019-2023**		
Program: B.Tech		**Current Academic Year: 2019-2020**		
Branch:CSE		**Semester:V**		
1	Course Code	CSE 348	Course Name	
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:** Understand important mathematical and statistical methods that are essential for Computer Science research and application development; **CO2:** Apply mathematical and statistical methods in their research and application development. **CO3:**Use a mathematical tool such as MATLAB efficiently.		
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 andtheirAnalysis**		
	A	Accuracyofnumbers,Errorsandageneralerrorformula,ErrorsinNumericalComputations.		CO1, CO2
	B	Errorsina Series Approximation.		CO1, CO2
	C	Precisions		CO1, CO3
	Unit 2	**Numerical Techniques**		
	A	LU decomposition for systems of linear equations;		CO1, CO2
	B	numerical solutions of non-linear algebraic equations by Secant, Bisection and Newton-Raphson Methods;		CO1, CO2,
	C	Numerical integration by trapezoidal and Simpson's rules.		CO1, CO2
	Unit 3	**Probability**		
	A	Probability: Conditional Probability;		CO1,CO2
	B	Mean, Median, Mode and Standard Deviation;.		CO1,CO2,CO3
	C	Random Variables; Distributions;		
	Unit 4	**Permutation**		
	A	uniform, normal, exponential		CO1,CO2
	B	Poisson, Binomial distribution		CO1,CO2
	C	Permutations; Combinations; Counting; Summation;		CO1,CO2,C

					O3
	Unit 5	**Hypothesis testing**			
	A	Generating functions; recurrence relations;			CO2,CO3
	B	Techniquesforstatisticalqualitycontrol,			CO2,CO3
	C	Testingofhypothesis.			CO1,CO2,CO3
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	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:** Understand important mathematical and statistical methods that are essential for Computer Science research and application development;	PO1,PO2,PO3, PSO1
2.	**CO2:** Apply mathematical and statistical methods in their research and application development.	PO1, PO3, PSO2
3.	**CO3:**Use a mathematical tool such as MATLAB efficiently.	PO1,PO2,PO3

Syllabus: CSE012,Introduction to Graph Theory and its Applications(Program Elective-1)

School: SET		**Batch: 2019-2023**		
Program: B.Tech		**Current Academic Year: 2019-2020**		
Branch:CS/IT		**Semester:5**		
1	Course Code	CSE349	Course Name: Introduction to Graph Theory and its Application	
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 **1.** demonstrate some of the most important notions and types of graph theory and develop their skill in solving basic exercises **2.** interpret the fundamentals of graphs and trees and to relate them with the use in computer science applications **3.** explore a graph with the help of matrices and to find a minimal spanning tree for a given weighted graph **4.** apply graph-theoretic algorithms and methods used in computer science **5.** develop efficient graph-theoretic algorithms (mathematically)explore the applications of coloring problem of graph theory		
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,CO4
	C	Special types of graphs (Hamiltonian, Euler), Travelling salesman problem		CO1, CO5
	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, CO3
	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.		CO4
	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
	B	Concept of Planar graphs with introduction to Kuratowski's non-planar graphs, Proof of Euler's formula		CO4

	C	Detection of planarity , geometric duals of graph, thickness & Crossings, network flow			CO5
	Unit 4	**Coloring and Covering**			
	A	Concept of proper coloring of vertices of a graph, chromatic number , Chromatic partitioning			CO4, CO5
	B	Chromatic polynomial, finding chromatic polynomial of a given graph			CO4, CO5
	C	Matching, Covering, Five color problem and its proof			CO4, CO5
	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, andC_f			CO4, CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	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 exercises	PO1, PO2, PSO1
2.	CO2: interpret the fundamentals of graphs and trees and to relate them with the use in computer science applications	PO1, PO2, PO3, PO4, PSO2
3.	CO3: explore a graph with the help of matrices and to find a minimal spanning tree for a given weighted graph	PO3, PO4, PO5, PSO2
4.	CO4: apply graph-theoretic algorithms and methods used in computer science	PO4, PO5, PO6, PSO2, PSO4
5.	CO5: develop efficient graph-theoretic algorithms (mathematically) explore the applications of colouring problem of graph theory	PO4, PO5, PO9, PSO2, PSO4

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

Cos	PO1	PO 2	PO3	PO4	PO 5	PO 6	PO7	PO 8	PO9	PO10	PO 11	PO12	PS O1	PSO2	PS O3	PSO4	PSO 5

CO1	3	3	2	2	1	1	1	1	1	1	2	2	3	2	1	2	1
CO2	3	3	3	3	2	1	1	1	2	2	1	2	2	3	1	2	1
CO3	2	2	3	3	3	2	1	1	1	2	2	2	2	3	2	2	2
CO4	2	2	2	3	3	3	1	2	2	1	1	2	2	3	2	3	1
CO5	2	2	2	3	3	2	2	2	3	1	1	2	1	3	1	3	1

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

Syllabus: CSP 298, Project Based Learning(PBL) -2

School: SET		**Batch : 2018-2022**	
Program: B.Tech		**Current Academic Year: 2018-2019**	
Branch: CSE		**Semester: 4th**	
1	Course Code	**CSP298** Course Name: Project Based Learning - 2	
2	Course Title	Project Based Learning -2	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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: Acquire practical knowledge within the chosen area of technology for project development CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach CO3: Discuss and accumulate the background information CO4: Develop effective communication skills for presentation of project related activities CO5: Contribute as an individual or in a team in development of technical projects CO6: Prepare a technical report based on the project.	
7	Course Description	In PBL-2, the students will learn how to define the problem for developing projects, identifying the skills required to develop the project based on given a set ofspecifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition,Team/Group formation and Project Assignment.	CO1, CO2
	Unit 2	Description and design of the proposed project. Specifying resource requirement, if any.	CO1, CO2
	Unit 3	Implementation work under the guidance of a faculty member.	CO1, CO2, CO3
	Unit 4	Demonstrate and execute Project with the team.	CO3, CO4
	Unit 5	The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.	CO4, CO5, CO6
		Report should include Abstract, Introduction, Proposed System Design/Algorithm, Experimentation & Result Analysis, Conclusion, and References. Presentation – PBL-2	

	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Acquire practical knowledge within the chosen area of technology for project development	PO1, PO2, PO4, PO9, PO10, PO11, PO12
2.	CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: Discuss and accumulate the background information	PO1, PO2, PO5, PO9, PO10, PO11, PO12
4.	CO4: Develop effective communication skills for presentation of project related activities	PO1, PO2, PO6, PO9, PO10, PO11, PO12
5.	CO5: Contribute as an individual or in a team in development of technical projects	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
6.	CO6: Prepare a technical report based on theproject.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

PO and PSO mapping with level of strength for Course Name Project Based Learning - 2 (Course Code CSP298)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	-	-	-	-	3	3	2	3
CO2	3	2	-	3	-	-	2	-	3	3	2	3
CO3	3	2	-	-	2	-	-	-	3	3	2	3
CO4	3	3	-	-	-	2	-	-	3	3	2	3
CO4	3	3	2	2	2	2	3	3	3	3	2	3
CO4	3	3	2	2	2	2	3	3	3	3	2	3

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

Syllabus: CSE350, Design and Analysis of Algorithm

School: SET		**Batch :2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-20**	
Branch: CSE		**Semester: V**	
1	Course Code	CSE 350 | Course Name: Design and Analysis of Algorithms	
2	Course Title	Design and Analysis of Algorithms	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	UG	
5	Course Objective	Objective of this course is to 4. Reinforce basic design concepts (e.g., pseudocode, specifications, top-down design) 5. Knowledge of algorithm design strategies 6. Familiarity with an assortment of important algorithms. 7. Enable students to analyze time and space complexity	
6	Course Outcomes	Students will be able to: **CO1:** Analyze the asymptotic performance of algorithms **CO2**: Write rigorous correctness proofs for algorithms. **CO3:** Demonstrate a familiarity with major algorithms and data structures **CO4:** Apply important algorithmic design paradigms and methods of analysis	
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	CO2, 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, Heap Sort	CO1, CO2, CO4
	Unit 2	**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 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, 0/1 Knapsack Problem			CO1, CO2, CO3, CO4
	C	Applications and analysis: Longest Common sub-sequence, Optimal Binary Search tree			
	Unit 4	**Greedy Method**			CO1,CO2,CO3
	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, Bellman-ford Algorithm,			CO1,CO2,CO3
	C	Overview and analysis of Backtracking & Branch and Bound: N-Queens problem and Sum of subsets			
	Unit 5	**Selected Topics**			CO1,CO2,CO3,
	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	MTE	ETE	
		30%	20%	50%	
	Text book/s*	3. Cormen et al., "Introduction of Computer Algorithms", Prentice Hall India			
	Other References	3. Sahni et al., "Fundamentals of Computer Algorithms", Galgotia Publications. 4. Hopcroft A, The Design And Analysis Computer Algorithms, Addison Wesley			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:**Analyze the asymptotic performance of algorithms	PO1,PO2,PO3,PO4,PSO1
2.	**CO2**: Write rigorous correctness proofs for algorithms	PO1, PO3, PO4, PSO2
3.	**CO3:** Demonstrate a familiarity with major algorithms and data structures	PO1,PO2,PO3,PO4

4.	**CO4:**Apply important algorithmic design paradigms and methods of analysis	PO9, PO10,PO11, PSO5

PO and PSO mapping with level of strength for Course Name Design and Analysis of Algorithm Course Code CSE 350)

Cos	PO1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO 8	PO9	PO10	PO 11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

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

1	Course number	CSE021
2	Course Title	**Introduction to Cloud Computing**
3	Credits	**3**
4	Contact Hours	**3-0-0**
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. 1. Classify and describe the architecture and taxonomy of parallel and distributed computing, including shared and distributed memory, and data and task parallel computing. 2. Characterize the distinctions between Infrastructure, Platform and Software as a Service (IaaS, PaaS, SaaS) abstractions, and Public and Private Clouds, and analyze their advantages and disadvantages. 3. Examine the design of task and data parallel distributed algorithms for Clouds and use them to construct Cloud applications. Demonstrate the use of Map-Reduce, Vertex-Centric and Continuous Dataflow programming models..
7	Outline syllabus	
7.01	Unit A	**Introduction**
7.02	Unit A Topic 1	Introduction to distributed systems and cloud computing
7.03	Unit A Topic 2	Cloud architectures: SaaS, PaaS, IaaS.
7.04	Unit A Topic 3	End-to-end system design. Networks and protocol stacks.
7.05	Unit B	**Remote Procedure Call**
7.06	Unit B Topic 1	Client-server computing. Sockets and remote procedure call.
7.07	Unit B Topic 2	RMI, CORBA.
7.08	Unit B Topic 3	Storage in the Cloud: Google file system.
7.09	Unit C	**Cloud Services**
7.10	Unit C Topic 1	Web services and REST. Example: Amazon S3.
7.11	Unit C Topic 2	The JAX-RS API, Persistent cloud services.
7.12	Unit C Topic 3	Three-tier middleware. JEE APIs. Google App Engine.
7.13	Unit D	**Sockets**
7.14	Unit D Topic 1	Message queues and message brokers.
7.15	Unit D Topic 2	JMS and Atmosphere. Web sockets
7.16	Unit D Topic 3	Distributed snapshots.
7.17	Unit E	**Applications**
7.18	Unit E Topic 1	Batch cloud computing: MapReduce and Hadoop.
7.19	Unit E Topic 2	Applications in NoSQL data stores, Applications to scientific data Mining techniques.
7.20	Unit E Topic 3	Popular Cloud Computing Systems from Google, Microsoft & IBM.
9.1	Text book	Dominic Duggan, Enterprise Software Architecture and Design, Willy Publication, 2013.
9.2	Other references	1. Distributed and Cloud Computing, 1st edition, Morgan Kaufmann, 2011. 2. Greg Schulz, “Cloud and Virtual Data Storage Networking”, Auerbach Publications [ISBN: 978-1439851739], 2011. 3. Marty Poniatowski, “Foundations of Green IT” Prentice Hall; 1 edition, 2009. 4. 5. EMC, “Information Storage and Management” Wiley; 2 edition,2012. 5. Internet as a resource for reference

1	Course Code	**CSE022**
2	Course Title	**Android Application Development**
3	Credits	**3**
4	Contact Hours	**3-0-0**
5	Course Objective	
6	Course Outcomes	
7	**Prerequisite**	**Knowledge of java programming**
8	**Course Contents**	
8	Unit A	**Introduction to Android**
8	Unit A Topic 1	Android architecture, Feature of android, Limitation of mobile devices
8	Unit A Topic 2	Configuration of android SDK, Activity life cycle, AVD manager
8	Unit A Topic 3	Generation of APK file for android project, Test run of application on device
8.1	Unit B	**Android UI Components**
8.1	Unit B Topic 1	Layouts-Linear layout, Relative layout, Table layout, Frame layout
8.1	Unit B Topic 2	Event delegation model, Type of Event Listeners, Onclick, OnLongClick, OnFocusChanged, OnKeyUp, OnKeyDown
8.1	Unit B Topic 3	Button, TextView, EditTextView, Label, List, Radio Button, Checkbox, date picker
8.1	Unit C	**Notification and Intents**
8.1	Unit C Topic 1	Type of notification, Toast notification, status bar notification and alert notification
8.1	Unit C Topic 2	Concept of intent, configuration of intent, Intent filters
8.1	Unit C Topic 3	Creating Menu, Option Menu, Context Menu, Popup Menu
8.1	Unit D	**Working with SQL Lite**
8.1	Unit D Topic 1	Introduction to SQLite databse, Steps for connecting application with database.
8.2	Unit D Topic 2	Fetch and update data in database from application,
8.2	Unit D Topic 3	Cursor and content value, opening and closing database
8.2	Unit E	**Sensor Device**
8.2	Unit E Topic 1	Sensor Manager, Sensor Framework, Types of Sensors Accelerometer, Gyroscope, Proximity Sensor, Orientation, Light Sensor
8.2	Unit E Topic 2	Detect availability of sensor, Fetch data from sensors on frequent basis,
8.2	Unit E Topic 3	Development of compass application with help of gyroscope sensor
9	**Course Evaluation**	
10	**Reading Content**	
10	Text book*	1. Android Application Development, Wrox publication
10	other references	1. Android UI Fundamentals : Develop and Design 2. Internet as a resource for reference

School: SET		**Batch :** 2019-20
		Current Academic Year: 2019-20
		Semester: 5th
1	Course Code	**ARP 301**
2	Course Title	Personality Development and Decision making Skills
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
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 student will have entered the threshold of his/her 3rd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	CO1: *Understanding Personality and its traits | The art of impression management* CO2: *Personality Development and Transformation – Value & Ethics – Contribution to the society.* CO3: *Behavioural and Interpersonal Skills* CO4: *Avoiding Arguments | The Art of Assertiveness* CO5: *Argument Handling - Verbal & Writing Skills* CO6: *The 4M Model | Verbal Abilities-3* CO7: *Level 3 of Quant , Aptitude and Reasoning abilities*
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 – ARP301		
	Unit 1	**Impress to Impact**	**CO MAPPING**
	A	What is Personality?|Who Am I? Creating a positive impression – The 3 V's of Impression | Individual Differences and Personalities	CO1
	B	Personality Development and Transformation – Value & Ethics| Building Self Confidence | Behavioural and Interpersonal Skills (My contribution towards society/ nation)	CO2, CO3
	C	Avoiding Arguments – Essay Writing | The Art of Assertiveness | The Personal Effectiveness Grid | Assessing our Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model | Verbal Abilities-3	CO4, CO5, CO6,
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Numbers & Digits , Mathematical Operations | Analytical Reasoning	CO7
	B	Cubes & Cuboids | Statement & Assumptions	CO7
	C	Strong & Weak Argument	CO7

	Unit 3	**Quantitative Aptitude**	
	A	Work & Time ,Pipes & Cistern	CO7
	B	Time ,Speed & Distance, Quadratic & Linear Equations, Logs & Inequalities	CO7
	C	Sequence & Series, Logarithms, Data Interpretation | Data sufficiency - Level 1	CO7
	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*	

Syllabus: CSP 350, Design and Analysis of Algorithm Lab

School: SET		**Batch: 2019-2023**			
Program: B.Tech		**Current Academic Year: 2019-2020**			
Branch: CSE		**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			
5	Course Objective	Objective of this course is to • Reinforce basic design concepts (e.g., pseudocode, specifications, top-down design) • Knowledge of algorithm design strategies • Familiarity with an assortment of important algorithms. • Enable students to analyze time and space complexity			
6	Course Outcomes	Students will be able to: **CO1:** Analyze the asymptotic performance of algorithms **CO2**: Write rigorous correctness proofs for algorithms. **CO3:** Demonstrate a familiarity with major algorithms and data structures **CO4:** Apply important algorithmic design paradigms and methods of analysis			
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 algorithm design by brute force and divide and conquer paradigm**			CO1, CO2, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 2	**Practical related to dynamic programming paradigm**			CO1, CO2. CO3, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 3	**Practical related to greedy method**			CO2, CO3, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 4	**Practical related to advanced data structures**			CO2, CO3, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 5	**Practical related to string matching algorithms**			CO1, CO2, CO3, CO4
		Sub unit - a, b and c detailed in Instructional Plan			
	Mode of examination	Jury/Practical/Viva			
	Weightage	CA	MTE	ETE	

	Distribution	60%	0%	40%	
	Text book/s*	-			
	Other References				

Syllabus: CSP 395, Technical Skill Enhancement Course-1 (Simulation Lab)

School: SET		**Batch: 2019-2023**	
Program: B.TECH		**Current Academic Year: 2019-2020**	
Branch:CSE		**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	• Demonstrate basic programming skills – functions, arrays, loops, conditional statements, procedures • Demonstrate technical communication skills: Create a comprehensive report and an oral presentation with accurate visual representations of a model and its results.	
6	Course Outcomes	Students will be able to: **CO1:** Students will apply MATLAB Programming to solve real life problem. **CO2:** implement the mathematical representation of the model. **CO3:** create a simulation in a computational tool in Matlab **CO4:** Utilize Matlab as a computational tool	
7	Course Description	This course introduces the concepts of MATLAB programing, 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-I	**Introduction**	
	A	Introduction to MATLAB, Basic Commands, Variables and Operators, Logical Operators and their Control flow, Algorithm	CO1, CO2
	B	MATLAB conditional statements	CO1, CO2
	C	MATLAB loops, Solve a problem for one case, then iterate (Take care of middle, then first and last)	
	UNIT-2	**Structures and Cell arrays**	
	A	Structures, Properties, Declaration of Structure, Definition, Accessing Elements from structure, Use of Structure	CO2,CO3

	B	Array, Cell Array, Array operation, Cell Array Operations, Introduction Complexity, Divide and conquer.			CO2
	C	Scripts and Functions			CO3
	UNIT-3	**Review of Mathematical Operations**			
	A	Mathematical operations on sequences: Convolution, graphical and analytical techniques			CO2
	B	Overlap and add methods, matrix method, some examples and solutions of LTI systems,			CO2
	C	MATLAB examples			CO1,CO3
	UNIT-4	**Modeling**			
	A	Stochastic models, Curve fitting, Graphing data in MATLAB			CO4
	B	Accuracy and precision in modeling			CO1, CO2
	C	Verification and validationProject on Simulation based			CO1, CO2
	UNIT-V	**Matlab Applications**			
	A	Working with Sound, Working with Images			CO2, CO4
	B	File, Types of File, file Input/Output Operations, Reading and Writing files, Building GUI's			CO1, CO2
	C	Recursion, Compression			CO1, CO3
	UNIT-5	**Visualization**			
	A	Stochastic models, Curve fitting,			CO4
	B	Graphing data in MATLAB			CO4
	C	Accuracy and precision in modeling			CO4
	Mode of examination	Verification and validationProject on Simulation based			
	Weightage Distribution	Project on Simulation based	ETE		
		60 %	40%		
	Text book/s*				
	Other References	1.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	**CO1:** Students will apply MATLAB Programing to solve real life problem.	PO1,PO2,PO3,PO4,PSO1
2.	**CO2:** implement the mathematical representation of the model.	PO1, PO3, PO4, PSO2
3.	**CO3:** create a simulation in a computational tool in Matlab	PO1,PO2,PO3,PO4

4.	**CO4:** Utilize Matlab as a computational tool -	PO9, PO10,PO11, PSO5

PO and PSO mapping with level of strength for Course NameSimulation Lab (Course Code CSP 302)
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	PS O4	PSO5
CO1	3	3	3	3	--	--	--	2	2	1	2	1	3	2	2	1	2
CO2	3	2	3	3	--	--	--	2	2	2	1	1	2	3	2	1	2
CO3	3	3	3	3	--	--	--	1	1	1	3	2	3	2	1	1	1
CO4	2	2	2	2	1	--	--	2	3	3	3	1	2	2	2	1	3

Syllabus: CSP 397, Project Based Learning(PBL)-3

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: 5th**	
1	Course Code	**CSP397** | Course Name: Project Based Learning -3	
2	Course Title	Project Based Learning – 3	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	4.To align student's skill and interests with a realistic problem or project 5.To understand the significance of problem and its scope 6.Students will make decisions within a framework	
6	Course Outcomes	Students will be able to: CO1: Acquire practical knowledge within the chosen area of technology for project development CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach CO3: To prepare the designs requirements, functional and concept design. CO4: Develop effective communication skills for presentation of project related activities CO5: Contribute as an individual or in a team in development of technical projects CO6: Prepare a technical report based on the project.	
7	Course Description	In PBL-3, the students will learn how to define the problem for developing projects, identifying the skills required to develop the project based on given a set ofspecifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition,Team/Group formation and Project Assignment.	CO1, CO2
	Unit 2	Description and design of the proposed project using ER Diagrams.Specifying resource requirement, if any.	CO1, CO2
	Unit 3	Implementation work under the guidance of a faculty member.	CO1, CO2, CO3
	Unit 4	Demonstrate and execute Project with the team.	CO3, CO4
	Unit 5	The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.	CO4, CO5, CO6
		Report should include Abstract, Introduction, Proposed System Design/Algorithm, Experimentation & Result Analysis, Conclusion, and References.	

		Presentation – PBL-3			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Acquire practical knowledge within the chosen area of technology for project development	PO1, PO2, PO4, PO9, PO10, PO11, PO12
2.	CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: Discuss and accumulate the background information	PO1, PO2, PO5, PO9, PO10, PO11, PO12
4.	CO4: Develop effective communication skills for presentation of project related activities	PO1, PO2, PO6, PO9, PO10, PO11, PO12
5.	CO5: Contribute as an individual or in a team in development of technical projects	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
6.	CO6: Prepare a technical report based on theproject.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

PO and PSO mapping with level of strength for Course Name Project Based Learning - 3 (Course Code CSP397)

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

Syllabus: CSP 399, Summer Internship-II

School: SET		**Batch: 2019-2023**	
Program:B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester:V**	
1	Course Code	CSP399 Course Name	
2	Course Title	Industrial Internship-II	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	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	CO1. Experience of applying existing engineering knowledge in similar or new situations CO2. Ability to identify when new engineering knowledge is required, and apply it CO3. Ability to integrate existing and new technical knowledge for industrial application. CO4. Knowledge of contemporary/engineering practice. CO5. Use of acquired techniques, skills, and modern engineering tools necessary for engineering practice. CO6. Ability to work on multi-disciplinary teams.	
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. Specify the names of the university supervisor, the Host Organization supervisor and the duration, the period in which the internship will be carried out and any changes in duration	**CO1**
	Unit 2	The internship work plan is drawn up in consultation with the student, the supervising faculty at the university and the internship supervisor for the organisation offering the internship.	**CO2**
	Unit 3	Project during Internship involves: a) project activated by the Program Director / Host Organization. b) Project activity to be monitored by faculty members at the University. This activity must guarantee continuous presence and continuity to activities related to project.	**CO2,CO3**
	Unit 4	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	**CO5,CO6**

		before departmental committee.			
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	NIL	40%	
	Text book/s*	NA			
	Other References	NA			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1. Experience of applying existing engineering knowledge in similar or new situations	PO1, PO2, PO12, PSO4
2.	CO2. Ability to identify when new engineering knowledge is required, and apply it	PO1, PO12, PSO1, PSO4
3.	CO3. Ability to integrate existing and new technical knowledge for industrial application	PO1, PO2, PO12, PSO2, PSO4
4.	CO4. Knowledge of contemporary/engineering practice.	PO1,PO12, PSO 2,PSO4
5.	CO5. Use of acquired techniques, skills, and modern engineering tools necessary for engineering practice.	PO1,PO6,PO8,PO12, PSO 2,PSO4
6.	CO6. Ability to work on multi-disciplinary teams.	PO1,PO7,PSO2

PO and PSO mapping with level of strength for Industrial Internship-II(Course Code CSP 399)

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	PSO 2	PSO 3	PS O4	PS O5
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	3	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-

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

Syllabus: CSE 352, Web Technologies

School: SET		**Batch: 2019-2023**	
Program: Btech		**Current Academic Year: 2019-2020**	
Branch:CSE		**Semester:6**	
1	Course Code	CSE352 | Course Name	
2	Course Title	Web Technologies	
3	Credits	2	
4	Contact Hours (L-T-P)	2-0-0	
	Course Status	Compulsory	
5	Course Objective	Provide the knowledge to design and develop web application with and without database. Students will gain the skills and project-based experience needed for entry into web application and development careers. It provides information about web technologies that relate to the interface between web servers and their clients.	
6	Course Outcomes	On successful completion of this module students will be able to: 1. Design interactive web pages 2. Design web pages/site having validation on user data access. 3. Develop web site for small business and organization or for individual 4. Client server communication RMI	
7	Course Description	The purpose of this course is to give students the basic understanding of how different computers and devices to communicate and share resources as well as to give the basic overview of the different technologies.	
8	Outline syllabus		CO Mapping
	Unit 1	**INTRODUCTION TO HTML & JAVA SCRIPT**	
	A	HTML basic tags, various links implementation, image map, table formatting, form design.	CO1
	B	**Java Script:** Introduction, syntax, comment, statement, variable, operators, Conditional statements, looping statements	CO2
	C	Functions, object, events, Accessing form elements, validating form elements	CO2
	Unit 2	**XML**	
	A	Introduction, syntax, well form XML document, DTD, schema	CO1,CO3
	B	XML Processors/Parser: DOM and SAX	CO1,CO3
	C	XML Technology: xlink, xpath, xpointer, xslt , displaying XML file data into HTML file	CO1,CO3
	Unit 3	**JAVA APPLET & SERVLET**	
	A	Introduction to Applet , Creation of applet,Managing Applets	CO1,CO3
	B	Introduction to JDBC and its Components,Implementing JDBC in Applet.	CO1,CO3
	C	Servlet, Creating Servlet, Managing request and response in Servlet, Servlet Collaboration, Session Tracking	CO1,CO3
	Unit 4	**JAVA SERVER PAGES & ENTERPRISE JAVA BEANS**	
	A	Introduction to JSP , Life cycle of JSP,JSP Application Design	CO3
	B	Scripting elements, scriptlet tag, expression tag, declaration tag, Implicit Objects, JSP Objects, Directive Elements	CO3
	C	EJB - Introduction, Components of EJB, Architecture of EJB	CO3
	Unit 5	**RMI AND JAVA NETWORKING**	
	A	Remote Method Invocation - Introduction, Structure of	CO4

		RMI, Implementing RMI			
	B	Sockets: Introduction, Application, TCP socket, UDP socket			CO4
	C	Socket Implementation, Client and Server sockets, data transmission over socket			CO4
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	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.	CO1:Design interactive web pages by applying CSS .	PO3,PO5,PO8,PO12,PS01,PSO3,PSO4
1.	CO2: Design web page which has animation and dynamic data	PO3,PO5,PO8,PO10,PSO3,PSO4
2.	CO3: Design web pages/site having validation on user data access. .	PO3,PO4,PO5,PO8,PO10, PS01,PSO3,PSO4
3.	CO4: Develop web site for small business and organization or for individual	PO3,PO4,PO5,PO8,PO10, PO12,PSO3,PSO4

PO and PSO mapping with level of strength for Course Web Technologies (Course Code CSE 352)

Cos	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO 11	PO12	PS O1	PSO2	PSO3	PSO4
CO1	1	-	3	1	3	2	-	3	2	2	2	3	3	-	3	3
CO2	2	-	3	2	3	2	-	3	1	3	2	3	2	-	3	3
CO3	1	-	3	3	3	2	-	3	1	3	2	3	3	-	3	3
CO4	2	-	3	3	3	2	-	3	2	3	2	3	2	-	3	3

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

1	Course Code	**CSE032**
2	Course Title	**Cryptography and Network Security**
3	Credits	**3**
4	Contact Hours	**3-0-0**
5	Course Objective	
6	Course Outcomes	
7	**Prerequisite**	
8	**Course Contents**	
8.01	Unit A	**Introduction& symmetric Key Cryptography**
8.02	Unit A Topic 1	Computer Security Concepts- OSI security Architecture, Security attacks, Services, mechanism, model of network security
8.03	Unit A Topic 2	Classical encryption techniques- Substitution Cipher(Mono-alphabetic, Poly-alphabetic), Transposition cipher, Stegnography
8.04	Unit A Topic 3	Block Cipher- Encryption Principles, DES and its variants, strength of DES
8.05	Unit B	**Mathematics of Cryptography**
8.06	Unit B Topic 1	Eucledian, Extended Eucledian Algorithm, EuilersTotient Function , Ferment little Theorem, Eulers theorem
8.07	Unit B Topic 2	Primality Testing-Miller Rabin test, Chinese Remainder Theorem
8.08	Unit B Topic 3	Exponential- square and multiply method, Discrete Logarithm
8.09	Unit C	**Asymmetric Cryptography & Key Exchange**
8.10	Unit C Topic 1	Public Key cryptography-RSA, Cryptanalysis of RSA
8.11	Unit C Topic 2	Elgamal cryptography, Elliptic Curve cryptography
8.12	Unit C Topic 3	Key Management and distribution : KDC, Diffie Hellman Key Exchange
8.13	Unit D	**Digital signatures**
8.14	Unit D Topic 1	User Authentication protocol- Kerberos
8.15	Unit D Topic 2	Digital Signature –RSA, Elgamal, DSS
8.16	Unit D Topic 3	Data integrity algorithms-Hash Functions, MD5, SHA-512
8.17	Unit E	**Security**
8.18	Unit E Topic 1	Security at Application layer-Email Architecture, S/MIME, PGP-Scenarios, key rings
8.19	Unit E Topic 2	Security at Transport layer-SSL(Services, Protocols)
8.20	Unit E Topic 3	Security at Network layer-IPSec(Modes, Security Protocols-AH, ESP, Services provided by IPSEC)
10	**Reading Content**	
9.1	Text book*	5. Stallings, W., "Cryptography and Network Security – Principles and Practices", Prentice Hall of India, Fourth Edition.
9.2	other references	1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001. 2. Behrouz A. Forouzan, "Cryptography And Network Security"- McGraw Hill 3. Internet as a resource for reference

1	Course number	**CSE041**	
2	Course Title	**SOFTWARE PROJECT MANAGEMENT**	
3	Credits	3	
4	Contact Hours (L-T-P)	(3-0-0)	
5	Course Objective	To provide fundamental skills of software Project management emphasising on issues & hurdles associated with delivering successful projects, so as to make student aware of best project management practices, and contemporary software engineering tools.	
6	Course Outcomes	After successful completion of this course students should be able to: 1. Establish the process of software project management and its applications. 2. Evaluate a project & to develop the scope of work. 3. Provide accurate cost estimates and plan the various activities. 4. Develop Software projects according to quality standards.	
7	Outline syllabus:		
7.01	CSE427.A	Unit A	**INTRODUCTION**
7.02	CSE427.A1	Unit A Topic 1	Introduction to software project management, Stages of Software Project Management ,software projects versus other types of project
7.03	CSE427.A2	Unit A Topic 2	Categorization of software projects, Stake holders, setting objectives, WBS,PBS
7.04	CSE427.A3	Unit A Topic 3	Management control, Business case, Project success and failures, Software Tools for Project Management.
7.05	CSE427.B	Unit B	**PLANNING PHASE**
7.06	CSE427.B1	Unit B Topic 1	Introduction to project planning, types of project plan, elements, purpose of project plan
7.07	CSE427.B2	Unit B Topic 2	Step-wise project planning.
7.08	CSE427.B3	Unit B Topic 3	Development Lifecycle models: waterfall, Spiral, Iterative, incremental, v-shaped.
7.09	CSE427.C	Unit C	**PROJECT SCHEDULING**
7.10	CSE427.C1	Unit C Topic 1	Time management, Project Activity Definition, Activity sequencing, Activity Duration estimates
7.11	CSE427.C2	Unit C Topic 2	Project network, Project networking Models
7.12	CSE427.C3	Unit C Topic 3	CPM and PERT
7.13	CSE427.D	Unit D	**PROJECT COST ESTIMATION & PROJECT EVALUATION**
7.14	CSE427.D1	Unit D Topic 1	Importance and principles of Cost management, Cost Estimation Process, Earned value analysis
7.15	CSE427.D2	Unit D Topic 2	Software sizing: LOC, Function points, Cost Estimation Methods.

7.16	CSE427.D3	Unit D Topic 3	COCOMO, NPV, ROI, Payback, IRR.
7.17	CSE427.E	Unit E	**QUALITY PROJECT MANAGEMENT**
7.18	CSE427.E1	Unit E Topic 1	Introduction to quality project management, Phases
7.19	CSE427.E2	Unit E Topic 2	SICMM: Structure of CMM, Five maturity levels
7.20	CSE427.E3	Unit E Topic 3	Software process Framework for the CMM
8	Course Evaluation		
8.1	Course work: 30 marks		
8.11	Attendance	None	
8.12	Homework	10 Assignment (no Marks)	
8.13	Quizzes	7 best quiz (20 marks)	
8.14	Projects	None	
8.15	Presentations	10 marks	
8.16	Any other	None	
8.2	MTE	20 marks	
8.3	End-term examination: 50 marks		
9	References		
9.1	Text book	1. Kathy Schwalbe, “Information Technology Project Management” International Student Ed. THOMSON Course Technology 2. Cottrell M. and Hughes B., "Software Project Management", 5th Edition, The McGraw-Hill Companies.	
9.2	other references	1. Manish Kumar JHA “Software Project Management” 3rd Edition, Dhanpat Rai and Co. 2. QuantumPM, “Microsoft Office Project Server 2003 Unleashed”, Pearson Education India. 3. Robert T. Futrell, Donald F. Shafer and Linda I Shafer, “Quality Software Project” Pearson India. http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Soft%20Engg/New_index1.html http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/lecture-notes/	

1	Course number	CSE042	
2	Course Title	SOFTWARE TESTING	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
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	On successful completion of this module students will be able to 1. Perform functional and non-functional testing 2. Design test case and make test case report 3. Locate bugs and analyze their impact 4. Perform control flow and data flow testing 5. Memorize how to effectively plan your tests, communicate the bugs you find, and measure your success as a software tester 6. Assess various test automation tools available in market and choose appropriate tool for kinds of testing	
7	Outline syllabus		
7.01	CAP707.A	Unit A	Introduction
7.02	CAP707.A1	Unit A Topic 1	Human and errors, Testing Objectives, Principles of Testing, Behaviour and Correctness, Debugging and its techniques
7.03	CAP707.A2	Unit A Topic 2	Software metrics, Software Testing Life Cycle, Testing activities and Levels, Testing myths and facts
7.04	CAP707.A3	Unit A Topic 3	Testing exit criteria, Bug defect life cycle, White Box and Black Box Testing
7.05	CAP707.B	Unit B	Unit Testing
7.06	CAP707.B1	Unit B Topic 1	Concept of Unit Testing, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation Testing
7.07	CAP707.B2	Unit B Topic 2	Control Flow Testing: Overview of Control Flow Testing, Control Flow Graph, Paths in a Control Flow Graph
7.08	CAP707.B3	Unit B Topic 3	Path Selection Criteria, Regression testing , Agile testing
7.09	CAP707.C	Unit C	Data Flow & Performance testing
7.10	CAP707.C1	Unit C Topic 1	Data Flow Anomaly, Overview of Dynamic Data Flow Testing, Data Flow Graph, Data Flow Terms
7.11	CAP707.C2	Unit C Topic 2	Data Flow Testing Criteria, Comparison of Data Flow Test Selection Criteria, Feasible Paths and Test Selection Criteria
7.12	CAP707.C3	Unit C Topic 3	Integration Testing: Integration Testing, Integration Techniques , Performance testing: Stress , Load , Volume
7.13	CAP707.D	Unit D	Functional Testing
7.14	CAP707.D1	Unit D Topic 1	Equivalence Class Partitioning, Boundary Value Analysis, Decision Tables, Random Testing, Error Guessing, Category Partition
7.15	CAP707.D2	Unit D Topic 2	Test case designing – Test cases, Test case format, Test case designing, Acceptance testing and criteria
7.16	CAP707.D3	Unit D Topic 3	Automation testing**:** Need for automation , categorization of Testing tools, Selection of testing tools, Guidelines for automated testing, Overview of commercial testing tools

7.17	CAP707.E	Unit E	Controlling and Monitoring
7.18	CAP707.E1	Unit E Topic 1	Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM
7.19	CAP707.E2	Unit E Topic 2	Types ofreviews – Developing a review program – Components of Review Plans– Reporting
7.20	CAP707.E3	Unit E Topic 3	Review Results. – evaluating software quality – defect prevention – testing maturity model

8	Course Evaluation	
8.1	Course work: 30 marks	
8.11	Attendance	None
8.12	Homework	10 assignments, no weight
8.13	Quizzes	7 best quizzes (based on assignments) in tutorial hours; 30 marks
8.14	Projects	None
8.15	Presentations	None
8.16	Any other	
8.2	MTE	One, 20 marks
8.3	End-term examination: 50 marks	
9	References	
9.1	Text book	1. SagarNaik&PiyuTripathy, “Software Testing and Quality Assurance: Theory and Practice”, Wiley.
9.2	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

School: SET		**Batch : 2019-23**	
Program: B-TECH		**Current Academic Year: 2019-20**	
Branch: CSE		**Semester: VI**	
1	Course Code	**CSE031**	Course Name: Digital Image Processing
2	Course Title	Digital Image Processing	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	**Students will try to learn:** 7. To study the image fundamentals and mathematical transforms necessary for image processing. 8. To study the image enhancement techniques 9. To study image restoration procedures. 10. To study the image compression procedures	
6	Course Outcomes	Students will be able to: CO-7. ***Recognize*** the fundamental concepts of a digital image processing system. CO-8. ***Formulate*** images in the frequency domain using various transformations. CO-9. ***Perform*** operations for image enhancement and image restoration. CO-10. ***Interpret*** image segmentation and representation techniques. CO-11. ***Design*** Image application for recognitions. CO-12. ***Support*** Computer Vision techniques in intelligent systems.	
7	Course Description	Basic concepts of Digital Image Processing	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	
	A	**Fundamental of digital image processing:**	CO1,
	B	**Image Enhancement** in Spatial Domain	CO1
	C	Arithmetic/Logic Operations in Image enhancement	CO1
	Unit 2	**Image Enhancement in Frequency Domain**	
	A	Fourier Transform Filters –	CO2
	B	Low-pass filter in frequency domain	CO2
	C	High-pass filter in frequency domain	CO2
	Unit 3	**Image Restoration & segmentation**	
	A	Restoration Process model.	CO3
	B	Segmentation and Region Extraction,	CO3
	C	Edge Detection and Corner Detection.	CO3
	Unit 4	**Color Image Processing**	
	A	Color Models, Color Transformation	CO4
	B	Morphological Image Processing	CO4
	C	Morphological Operations	CO4

	Unit 5	**Application of Digital Image Processing**			
	A	Face Recognition			CO5 ,CO6
	B	Optical character recognition			CO5,CO6
	C	Computer vision			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.			
	Other References	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.			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO-1. ***Recognize*** the fundamental concepts of a digital image processing system.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
2.	CO-2. ***Formulate*** images in the frequency domain using various transformations.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
3.	CO-3. ***Perform*** operations for image enhancement and image restoration.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
4.	CO-4. ***Interpret*** image segmentation and representation techniques.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
5.	CO-5. ***Design*** Image application for recognitions.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5
6.	CO-6. ***Support*** Computer Vision techniques in intelligent systems.	PO1,PO2,PO3,PO11,PO12 PSO1,PSO2,PSO3,PSO4,SPO5

PO and PSO mapping with level of strength for Course Name Digital Image Processing **(Course Code CSE031)**

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

CO3	3	2	3	-	-	-	-	-	-	-	1	1	2	3	2	1	2
CO4	3	2	3	-	-	-	-	-	-	-	3	2	3	2	1	1	1
CO5	3	2	3	-	-	-	-	-	-	-	3	1	2	2	2	1	3
CO6	3	2	3	-	-	-	-	-	-	-	3	1	2	2	2	1	3

School: SET		**Batch :** 2019-23
		Current Academic Year: 2019-20
		Semester: 6th
1	Course Code	**ARP 302**
2	Course Title	Campus to Corporate
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
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	CO1: *Understanding basics of Human Resources* CO2: *Role Clarity | KRA | KPI | Understanding JD* CO3: *Conflict Management* CO4: *Art of Communication - Verbal* CO5: *Understanding Personal Branding* CO6: *Relationship Management | Verbal Abilities-4* CO 7: *Resume/ CV Writing | Writing Skills* CO8: *Level-4 Quant & aptitude, Reasoning abilities*
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 himself/herself, understand relations and empathise others with level-4 of quant, aptitude and logical reasoning
8	Outline syllabus – ARP 302	

	Unit 1	**Ace the Interview**	**CO MAPPING**
	A	HR Sensitization (Role Clarity | KRA | KPI | Understanding JD) | Conflict Management	CO1, CO2, CO3
	B	Mock Interviews| GD's| Extempore |JAM| Impromptu speeches| Personal Branding	CO4, CO5
	C	Empathy VS Sympathy | Relationship Management | Verbal Abilities-4	CO6
	D	Resume/ CV Writing | Sentence Correction –Spotting error | Synonyms & Antonyms	CO7
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**	
	A	Sitting Arrangement & Venn Diagrams | Puzzles | Distribution | Selection	CO8
	B	Direction Sense | Statement & Conclusion | Strong & Weak Arguments	CO8
	C	Analogies, Odd One out | Cause & Effect	CO8
	Unit 3	**Quantitative Aptitude**	CO8
	A	Average , Ratio & Proportions, Mixtures & Allegation	CO8
	B	Geometry-Lines, Angles & Triangles	CO8
	C	Problem of Ages | Data Sufficiency - L2	CO8

	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*	

Syllabus: CSP 352, Web Technologies Lab

School: SET		**Batch: 2018**	
Program: BTECH		**Current Academic Year:**	
Branch:CSE		**Semester: VII**	
1	Course Code	**CSP352**	
2	Course Title	Web Technologies Lab	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Provide the knowledge to design and develop web application with and without database. Students will gain the skills and project-based experience needed for entry into web application and development careers. It provides information about web technologies that relate to the interface between web servers and their clients.	
5	Course Objective	On successful completion of this module students will be able to: 1. Design interactive web pages 2. Design web pages/site having validation on user data access. 3. Develop web site for small business and organization or for individual 4. Client server communication RMI	
6	Course Outcomes	This course is an overview of the modern Web technologies used for the Web development. The purpose of this course is to give students the basic understanding of how different computers and devices to communicate and share resources as well as to give the basic overview of the different technologies.	
7	Course Description		
8	Outline syllabus		CO Mapping
	Unit 1	**INTRODUCTION TO HTML & JAVA SCRIPT**	
		1. Write HTML code to design College Website 2. Write HTML code to design students registration form 3. Write javascript code to perform validation on above form.	CO1, CO2
	Unit 2	**XML**	
		1. Write a program in XML to create Product Catalog. 2. Write a program for Product Catalog DTD. 3. Write a program to display the XML file data into HTML file.	CO1,CO2
	Unit 3	**JAVA APPLET & SERVLET**	
		1. Write a program to count number of character in words in the text written in text area. 2. Write a program to draw circle using mouse click event.	CO2, CO3,CO4

		3. Write a program to insert and then retrieve name,rollno,and branch rom the database using JDBC			
	Unit 4	**JAVA SERVER PAGES & ENTERPRISE JAVA BEANS**			
		1. Write a program to create registration form using jsp. 2. Write a program to describe jsp:param,jsp:include and jsp forward action. 3. Write a program to implement EJB			CO1,CO2,CO3
	Unit 5	**RMI AND JAVA NETWORKING**			
		1. Write a program to perform addition using RMI 2. Create Chat application using TCP socket Programming. 3. Write a program in which Client keeps reading input from user and sends to the server until "Over" is typed.			CO3,CO4
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	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	4. Rick Delorme," Programming in HTML5 with JavaScript and CSS3", Microsoft			

Syllabus: CSP 396, Technical Skill Enhancement Course-2(Application Development Lab)

School: SET		**Batch: 2019-2023**	
Program: BTech		**Current Academic Year: 2019-2020**	
Branch:		**Semester:6**	
1	Course Code	CSP301	
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: 1. Design App user Interface 2. Perform Event driven programming 3. Implement relational Databases on devices using SQLite 4. Examine the usage of commonly available device sensors while building Android App	
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**	
		1. Configuration of android SDK and test run of application on device 2. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. 3. Develop an Android Application to implement Activity life cycle.	CO1
	Unit 2	**Android UI Components**	CO1
		4. Create a layout of Calculator using Grid layout. 5. Develop an Android Application to implement event listener on above layout. 6. Develop an Android Application to implement implicit intent.	CO1
	Unit 3	**Services and Notification**	
		7. Develop an Android Application to implement Service life cycle	CO1,CO2

		8. Develop an Android Application to implement status bar notification 9. Create a menu with 5 options and selected option should appear in text box			
	Unit 4	**Working with SQL Lite**			CO1,CO2
		10. Create and Login application as above. On successful login, pop up the message. 11. Create an application to implement Create, Insert and update operation on the database. 12. Create an application to perform Delete and retrieve operation on the database.			CO1,CO2
	Unit 5	**Sensor Device**			
		13. Develop an Android Application to detect availability of all sensors. 14. Develop an Android Application to Fetch data from sensors 15. Develop an Android Application for development of compass application with help of Orientation sensor			CO1
	Mode of examination	Jury/Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	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			

Syllabus: CSP 398, Project Based Learning (PBL) -4

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: 6th**	
1	Course Code	**CSP398** Course Name: Project Based Learning -4	
2	Course Title	Project Based Learning-4	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	11. To align student's skill and interests with a realistic problem or project 12. To understand the significance of problem and its scope 13. Students will make decisions within a framework	
6	Course Outcomes	Students will be able to: CO1: Acquire practical knowledge within the chosen area of technology for project development CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach CO3: To design and implementsolutions to open-endedproblem/project. CO4: Develop effective communication skills for presentation of project related activities CO5: To deploy and justify the project and contribute as an individual or in a team in development of technical projects CO6: Use different tools forcommunication, design, implementation, testing andreport writing.	
7	Course Description	In PBL-4, the students will learn how to define the problem for developing projects, identifying the skills required to develop the project based on given a set ofspecifications and all subjects of that Semester.	
8	Outline syllabus		CO Mapping
	Unit 1	Problem Definition,Team/Group formation and Project Assignment. Create Software Requirement Specification	CO1, CO2
	Unit 2	Finalize and present the functional design brief, concept designs and the outline design process results to an outline design report.	CO1, CO2
	Unit 3	Implementation or Coding: the actual coding work of different modules/units is started.	CO1, CO2, CO3
	Unit 4	Test the project modules	CO3, CO4
	Unit 5	Demonstrate and execute Project with the team. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.	CO4, CO5, CO6
		Report should include Abstract, Introduction, Proposed System Design/Algorithm, Experimentation & Result Analysis, Conclusion, and References.	

		Presentation – PBL-4			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Acquire practical knowledge within the chosen area of technology for project development	PO1, PO2, PO4, PO9, PO10, PO11, PO12
2.	CO2: Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: Discuss and accumulate the background information	PO1, PO2, PO5, PO9, PO10, PO11, PO12
4.	CO4: Develop effective communication skills for presentation of project related activities	PO1, PO2, PO6, PO9, PO10, PO11, PO12
5.	CO5: Contribute as an individual or in a team in development of technical projects	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12
6.	CO6: Prepare a technical report based on theproject.	PO1, PO2, PO3, PO4,PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

PO and PSO mapping with level of strength for Course Name Project Based Learning - 4 (Course Code CSP398)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	-	-	-	-	3	3	2	3
CO2	3	2	-	3	-	-	2	-	3	3	2	3
CO3	3	2	-	-	2	-	-	-	3	3	2	3
CO4	3	3	-	-	-	2	-	-	3	3	2	3
CO4	3	3	2	2	2	2	3	3	3	3	2	3
CO4	3	3	2	2	2	2	3	3	3	3	2	3

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

1	Course No.	CSE051	
2	Course Title	WIRELESS NETWORKS	
3	Credit	3	
4	Contact Hours	3-0-0 (L-T-P)	
5	Course Objective	To enable students to understand the basic concepts of wireless networks specially MANETs and Sensor networks and apply these concepts for designing, evaluating and comparing wireless networks	
6	Course Outcomes	After successful completion of the course a student should be able to 1 Use the fundamental concepts of the course a student should be able to 2 Differentiate between various type of wireless networks 3 Configure wireless router 4 Differentiate between infrastructure and infrastructure less networks 5 Compare between various MAC, routing and MAC protocols for MANETs using NS2 6 Analyze energy management issue in MANETs 7 Analyze basic issues in sensor networks 8 Compare various MAC and routing protocols in sensor networks 9 Use various tools for sensor networks 10 Establish a sensor networks	
7.01	CSE443.A	Unit A	**FUNDAMENTAL OF WIRELESS NETWORKS**
7.02	CSE443.A1	Unit A Topic 1	Basic Networking Concepts
7.03	CSE443.A2	Unit A Topic 2	Wireless LANs and PANs: Bluetooth, 802.11, and Hiper LAN
7.04	CSE443.A3	Unit A Topic 3	Wireless internet, mobile ip (wi-fi routers)
7.05	CSE443.B	Unit B	**INTRODUCTION TO MANETs**
7.06	CSE443.B1	Unit B Topic 1	Overview of MANETs
7.07	CSE443.B2	Unit B Topic 2	Cellular vs. Ad-hoc networks, issues and challenges
7.08	CSE443.B3	Unit B Topic 3	MAC protocols for ad-hoc networks
7.09	CSE443.C	Unit C	**CHALLENGES IN MANETs**
7.10	CSE443.C1	Unit C Topic 1	Routing protocols for ad-hoc networks, DSR/AODV etc. (NS2)
7.11	CSE443.C2	Unit C Topic 2	Transport protocols for ad-hoc networks
7.12	CSE443.C3	Unit C Topic 3	Energy Management in Ad-Hoc Wireless Networks
7.13	CSE443.D	Unit D	**SENSOR NETWORKS**
7.14	CSE443.D1	Unit D Topic 1	Introduction, Applications and Issues
7.15	CSE443.D2	Unit D Topic 2	Networking Sensors, MAC protocols and Routing protocols
7.16	CSE443.D3	Unit D Topic 3	Infrastructure Establishment Issues
7.17	CSE443.E	Unit E	**CHALLENGES IN SENSOR NETWORKS**
7.18	CSE443.E1	Unit E Topic 1	Tasking and control in sensor networks

7.19	CSE443.E2	Unit E Topic 2	Sensor network plat forms and tools, emerging trends in sensor networks **(SENSE)**
7.20	CSE443.E3	Unit E Topic 3	Establishing sensor network using Zigbee,
7.21	CSE443.E4	Unit E Topic 4	Enabling Technologies For Wireless Sensor Networks.
8	Course Evaluation		
8.1	Course Work: 30 marks		
8.2	MTE	One, 20 percent	
8.3	End-term examination: 50 percent		
8.11	Attendance	None	
8.12	Homework	Three best out of 4 assignments: 20 marks	
8.13	Quizzes	Two 30-minutes surprise quizzes in lecture hours: 10 marks	
8.14	Project	None	
8.15	Presentation	None	
8.16	Any Other	None	
9	References		
9.1	Text Book	1. Ad Hoc Wireless Networks: Architectures and Protocols. C. Siva Ram Murthy, Prentice Hall PTR. 2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao and Leonidas Guibas, Publisher: Morgan Kaufmann.	
9.2	Other Refrences	1. Ad-hoc networks and sensor networks: Theory and Applications, D.D. Marios, D.P. Agarwal World Scientific.	

School: SET		**Batch : 2019-23**	
Program: B.Tech		**Current Academic Year: 19-20**	
Branch: CSE		**Semester: VII**	
1	Course Code	CSE061 Course Name	
2	Course Title	**Introduction to Internet of Things**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	UG	
5	Course Objective	• Explain the concept of IoT. • To analyze, design and develop IOT solutions. • To apply the concept of Internet of Things in the real world scenarios.	
6	Course Outcomes	On successful completion of the course, the student will: 1. Understand the concepts of Internet of Things 2. Analyze basic protocols in wireless sensor network 3. Design IoT applications in different domain and be able to analyze their performance 4. Implement basic IoT applications on embedded platform	
7	Course Description	This course introduces 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 build applications according to their problem statements.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to microprocessor**	
	A	Introduction of Microcomputer System: CPU, I/O devices, clock, memory, bussed architecture, tristate logic, address bus, data bus and control bus.	CO1
	B	Semiconductor Memories: Development of semiconductor memory, internal structure and decoding, memory read and write timing diagrams, ROM,EPROM,EEPROM, DRAM,	CO1
	C	Architecture of 8-bit Microprocessor: Intel 8085A microprocessor,Pin description and internal architecture.	CO1, CO2
	Unit 2	**Introduction to microcontroller**	
	A	**8051 Microcontroller Basics**: Inside the Computer, Microcontrollers and Embedded Processors, Block Diagram of 8051, PSW and Flag Bits, 8051 Register Banks and Stack, Internal Memory Organization of 8051,	CO1, CO2
	B	IO Port Usage in 8051, Types of Special Function Registers and their uses in 8051, Pins Of 8051. Memory Address Decoding, 8031/51 Interfacing With External ROM And RAM. 8051 Addressing Modes.	CO1, CO2
	C	**Assembly programming and instruction of 8051:** Introduction to 8051 assembly programming, Assembling and running an 8051 program, Data types and Assembler directives, Arithmetic, logic instructions and programs, Jump, loop and call instructions, IO port programming.	CO1, CO2,CO3
	Unit 3	**Network & Communication aspects**	
	A	Design Methodology - Embedded computing logic -	CO1,CO2

		Microcontroller,	
	B	System on Chips - IoT system building blocks - Arduino - Board details,.	CO1,CO2
	C	Introduction to - Raspberry Pi - Interfaces and Raspberry Pi with Python Programming	CO2
	Unit 4	**Challenges in IoT**	
	A	Design challenges	CO1,CO2,CO3
	B	Development challenges	CO1,CO2,CO3
	C	Security challenges, Other challenges	CO1,CO2,CO3
	Unit 5	**Domain specific applications of IoT**	
	A	Home automation	CO1,CO2,CO4
	B	Industry applications	CO1,CO2,CO4
	C	Surveillance applications, Other IoT applications	CO1,CO2,CO4
	Mode of examination	Theory	
	Weightage Distribution	CA: 30% / MTE: 20% / ETE: 50%	
	Text book/s*	1. Arshdeep Bahga and Vijay Madisetti, "Internet of Things – A Hand-on Approach", Universities press, 2015. 2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, —IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017	
	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:** Understand the concepts of Internet of Things	PO1,PSO1
2.	**CO2:** Analyze basic protocols in wireless sensor network	PO1,PO2, PO3, PO4, PSO2, PO5,PSO5
3.	**CO3:** Design IoT applications in different domain and be able to analyze their performance	PO2,PSO1
4.	**CO4:** Implement basic IoT applications on embedded platform	PO1, PO3,PO9, PO10,PO11,PO12,PSO3

PO and PSO mapping with level of strength for Course Name Internet of Things (Course CodeCSe061)

	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CSE	CO1	3	2	--	2	--	2	2	2	--	1	--	2	3	1	1	1	2

	CO 2	3	3	3	3	3	1	--	2	2	2	1	2	2	3	2	1	3
	CO 3	2	3	2	1	--	--	1	1	1	1	--	1	3	1	1	1	1
	CO 4	3	2	3	2	2	2	2	2	3	3	3	3	2	2	3	1	2

1	Course number	**CSE062**	
2	Course Title	**MOBILE COMPUTING**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
5	Course Objective	The objective of the course is to impart knowledge of mobile and wireless computing systems and techniques	
6	Course Outcomes	On successful completion of this module students will be able to: 1. synthesize the basic concepts and principles in mobile computing. 2. analyze the concept of wireless, mobile and sensor networks. 3. synthesize the structure and components for mobile IP and mobility Management. 4. develop algorithms for allocation estimations based on different positioning techniques and platforms. 5. develop and maintain a Wireless LAN 6. identify the important issues and concerns on security and privacy. 7. design and develop mobile applications.	
7	Outline syllabus		
7.01	CSE327.A	Unit A	**INTRODUCTION**
7.02	CSE327.A1	Unit A Topic 1	Wireless transmission , Frequencies for radio transmission
7.03	CSE327.A2	Unit A Topic 2	Signals , Antennas , Signal Propagation , Multiplexing, Modulations
7.04	CSE327.A3	Unit A Topic 3	Spread spectrum, MAC, SDMA , FDMA , TDMA , CDMA , Cellular Wireless Networks
7.05	CSE327.B	Unit B	**TELECOMMUNICATION NETWORKS**
7.06	CSE327.B1	Unit B Topic 1	GSM: Mobile services, System architecture, Radio interface, Protocols
7.07	CSE327.B2	Unit B Topic 2	Localization and calling, Handover, Security
7.08	CSE327.B3	Unit B Topic 3	General Packet Radio Service (GPRS): GPRS Architecture, GPRS network nodes,
7.09	CSE327.C	Unit C	**WIRELESS LANS**
7.10	CSE327.C1	Unit C Topic 1	Introduction to IEEE 802.11b/g/n
7.11	CSE327.C2	Unit C Topic 2	Bluetooth technologies and architecture.
7.12	CSE327.C3	Unit C Topic 3	HIPERLAN, WML programming
7.13	CSE327.D	Unit D	**MOBILE NETWORK LAYER**
7.14	CSE327.D1	Unit D Topic 1	Mobile IP Goals, Entities, IP packet Delivery Agent Advertisement and Discovery, Registration.
7.15	CSE327.D2	Unit D Topic 2	Hidden and exposed terminal problems ,Routing protocols classification,
7.16	CSE327.D3	Unit D Topic 3	DSDV, DSR, AODV **,** Security
7.17	CSE327.E	Unit E	**Mobile Transport Layer & Wireless Application Protocol**
7.18	CSE327.E1	Unit E Topic 1	Traditional TCP, Indirect TCP,
7.19	CSE327.E2	Unit E Topic 2	Snooping TCP, Mobile TCP
7.20	CSE327.E3	Unit E Topic 3	WAP: Protocols, Architecture
8	Course Evaluation		

8.1	Course work: 30 marks	
8.11	Attendance	none
8.12	Homework	10 assignments, no weight
8.13	Quizzes	7 best quizzes (based on assignments) in tutorial hours; 30 marks
8.14	Projects	none
8.15	Presentations	none
8.16	Any other	
8.2	MTE	One, 20 marks
8.3	End-term examination: 50 marks	
9	References	
9.1	Text book*	6. JochenSchiller : Mobile Communication, Pearson Education. 7. U. Hansman and L. Merck : Principles of Mobile Computing", 2nd Ed., Springer
9.2	other references	1. A. S. Tanenbaum. : Computer Networks, 4th Ed., Pearson Education. 2. D. Milojicic, F. Douglis. : Mobility Processes, Computers and Agents", Addison Wesley 8. D.B. Lange and M. Oshima : Programming and Deploying Java Mobile Agents with Aglets, Addison Wesley.

1	Course number	**CSE354**
2	Course Title	**ARTIFICIAL INTELLIGENCE**
3	Credits	3
4	Contact Hours	3-0-0
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	On successful completion of this module students will be able to • distinguish between AI and non-AI solution, • apply AI techniques in problem solving, • analyse the best search technique and implement it in real-life applications • explore the scope of AI in various application domains
7	Outline syllabus	
7.01	CSE428.A	**INTRODUCTION TO AI**
7.02	CSE428.A1	Foundation of AI, Goals of AI, History and AI course line
7.03	CSE428.A2	Introduction to Intelligent Agents; Environment; Structure of Agent
7.04	CSE428.A3	AI Solutions Vs Conventional Solutions; a philosophical approach; a practical approach
7.05	CSE428.B	**PROBLEM SOLVING AGENTS**
7.06	CSE428.B1	Problem solving using Search Techniques; Problems; Solutions; Optimality
7.07	CSE428.B2	Informed Search Strategies; Greedy Best-First; A* Search; Heuristic Functions
7.08	CSE428.B3	Uninformed Search Strategies; BFS; DFS; DLS; UCS; IDFS; BDS
7.09	CSE428.C	**KNOWLEDGE & REASONING**
7.10	CSE428.C1	Knowledge-Based Agents; Logic; First-Order Logic; Syntax-Semantics in FOL; Simple usage;
7.11	CSE428.C2	Inference Procedure; Inference in FOL; Reduction; Inference Rules;
7.12	CSE428.C3	Forward Chaining; Backward Chaining; Resolution
7.13	CSE428.D	**LEARNING**
7.14	CSE428.D1	Common Sense Vs Learning; Components; Representations; Feedback
7.15	CSE428.D2	Learning Types: Supervised; Unsupervised; Reinforcement Learnings
7.16	CSE428.D3	Artificial Neural Networks: Introduction, types of networks; Single Layer and Multi-Layer n/w.
7.17	CSE428.E	**APPLICATIONS**
7.18	CSE428.E1	AI Present & Future; application case studies on NLP, Image Processing;
7.19	CSE428.E2	Robotics – Hardware; Vision; Navigation based case studies;
7.20	CSE428.E3	Ambient Intelligence case studies;
8	Course Evaluation	
8.1	Course work: 30 marks	
8.11	Attendance	100%
8.12	Homework	Assignments (4)
8.13	Quizzes	5
8.14	Projects	Optional
8.15	Presentations	
8.16	Any other	Posters (optional)
8.2	MTE	One, 20 marks
8.3	End-term examination: 50 marks	
9	References	
9.1	Text book*	9. *Rich E*& Knight K, *Artificial Intelligence,* Tata McGraw Hill, Edition 3.
9.2	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.

Syllabus:CSP 354, Artificial Intelligence Lab

School: SET		**Batch: 2019-2023**	
Program: B.Tech CSE		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: VII**	
1	Course Code	CSP354	
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 is to gain knowledge of basic concepts of artificial intelligence and machine learning.	
6	Course Outcomes	Upon successful completion of this course, the student will be able to: CO1. Identify the basic components of library environment and installations. CO2. Understand the working of machine learning libraries. CO3. Analyze the significant methodology needs to be applied for data preprocessing. CO4. Develop some application oriented projects on Image Processing, Natural Language Processing etc CO5. Identify how to use github and submit back genuine contributions on the same.	
7	Course Description	Artificial Intelligence Lab covers the hands-on, understanding and analysis of machine learning technology and to trace its recent trend.	
8	Outline syllabus		CO Mapping
	Unit 1	**Library Environment Understanding and installation**	
		1. To install the pypi libraries for Machine Learning. 2. Review of python datatypes for Artificial Intelligence and Machine Learning	CO1
	Unit 2	**Machine Learning Experiments**	
		1. Develop a machine learning model for standard database using Support Vector Machines 2. Develop a machine learning model for standard database using Decision Trees. **3.** Develop a machine learning model for standard database using Random Forest.	CO2
	Unit 3	**Data Preprocessing**	
		1. Deploy standardization and normalization on some standard dataset. **2.** Deploy Principal Component Analysis to extract relevant features on some standard database.	CO3
	Unit 4	**Application Oriented Experiment**	
		1. Develop a decision boundary for facial recognition purpose. 2. Develop a decision boundary to predict the emotions from the human voice.	CO4
	Unit 5	**Industry Oriented Experiments**	
		1. Understanding of github and conda environments.	CO5

		2. To use the github packages and libraries to frame a standard project and commit back to github.			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	MTE	ETE	
		60%	0%	40%	
	Text book/s*	1. Russell S &Norvig P, *Artificial Intelligence: A Modern Approach*, Prentice Hall.			
	Other References	1. D. H. Wolpert. The supervised learning no-free-lunch theorems. In Soft Computing and Industry, pages 25–42. Springer, 2002. 2. V. Vapnik. The nature of statistical learning theory. Springer Science & Business Media, 2013. 3. C. J. Burges. A tutorial on support vector machines for pattern recognition. Data mining and knowledge discovery, 2(2):121–167, 1998. 4. J. H. Friedman, J. L. Bentley, and R. A. Finkel. An algorithm for finding best matches in logarithmic expected time. ACM Transactions on Mathematical Software (TOMS), 3(3):209–226, 1977.			

Syllabus: CSP 497, Major Project -1

School: SET		**Batch: 2019-2023**	
Program: B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester: 7th**	
1	Course Code	**CSP497** Course Name: Major Project -1	
2	Course Title	Major Project -1	
3	Credits	3	
4	Contact Hours (L-T-P)	0-0-0	
	Course Status	Compulsory	
5	Course Objective	14. To align student's skill and interests with a realistic problem or project 15. To understand the significance of problem and its scope 16. To realize the outcome artifacts of the project. 17. Students will make decisions within a framework	
6	Course Outcomes	Students will be able to: CO1: Identify problems in engineering and technology in selected field of interest. Gather and manage the information required to develop a project CO2: Discuss and accumulate the background information CO3: Synthesize and apply prior knowledge of mathematics, computer science and engineering. CO4: To prepare the designs requirements, functional and concept design. CO5: To build and evaluate the modules to verify the required need of the project. CO6: To start the actual implementation of the project work to produce the deliverables. To design and implement solutions to open-ended problem/project.	
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 orinvolving 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
	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	CO2, CO3, CO4
	Unit 4	Identify and Implement Project Modules	CO4, CO5
	Unit 5	Use of appropriate tools/technologies for coding the modules	CO4, 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	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text book/s*				
	Other References				

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: Identify problems in engineering and technology in selected field of interest. Gather and manage the information required to develop a project	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO11, PO12
2.	CO2: Discuss and accumulate the background information.	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: Synthesize and apply prior knowledge of mathematics, computer science and engineering	PO1, PO2, PO3, PO6, PO5, PO9, PO10, PO11, PO12
4.	CO4: To prepare the designs requirements, functional and concept design	PO1, PO2, PO3, PO6, PO7, PO9, PO10, PO11, PO12
5.	CO5: To build and evaluate the prototype to verify the required need of the project.	PO1, PO2, PO3, PO4, PO5, PO7, PO9, PO10, PO11, PO12
6.	To start the actual implementation of the project work to produce the deliverables. To design and implement solutions to open-ended problem/project.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

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
CO1	3	2	3	3	3	-	-	2	3	3	2	3
CO2	3	2	3	3	3	-	2	-	3	3	2	3
CO3	3	2	3	-	3	3	-	-	3	3	2	3
CO4	3	2	3	-	-	2	2	-	3	3	2	3
CO5	3	2	3	3	3	-	2	2	2	3	3	3
CO6	3	2	3	3	3	1	3	3	3	3	3	3

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

Syllabus: CSP 499, Summer Internship-III

School: SET		**Batch: 2019-2023**	
Program:B.Tech		**Current Academic Year: 2019-2020**	
Branch: CSE		**Semester:VII**	
1	Course Code	CSP499 Course Name	
2	Course Title	Summer Internship-III	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-0	
	Course Status	UG	
5	Course Objective	1. Get hands-on experience about real world problems in a field relevant to their major of studies. 2. Acquire confidence for employment after graduation. 3. Acquire skills important for time management, discipline, selflearning 4. Effective communication and so on. Learn practically about team-work, collaboration, and leadership.	
6	Course Outcomes	CO1: Arrive at work as scheduled, ready to work, and stay for the agreed upon time CO2: Present yourself in a professional manner at all times, including being appropriately dressed for your workplace CO 3: Communicate any concerns with your supervisor and the internship coordinator in a timely manner and respectfully CO 4: Demonstrate enthusiasm and interest in what you are doing; ask questions and take initiative as appropriate. CO 5. Exposure to professional and ethical responsibility	
7	Course Description	The Internship aims to offer students the opportunity to apply their knowledge in real-life environments through an industry placement for eight-weeks. It is expected that the skills students will gain from working with an organization will help them perform better on their jobs after graduation. In addition, the Internship greatly increases the chances for students to obtain full time employment after graduation.	
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. Specify the names of the university supervisor, the Host Organization supervisor and the duration, the period in which the internship will be carried out and any changes in duration	**CO1**
	Unit 2	The internship work plan is drawn up in consultation with the student, the supervising faculty at the university and the internship supervisor for the organisation offering the internship.	**CO2**
	Unit 3	Project during Internship involves: a) project activated by the Program Director / Host	**CO3,CO6**

		Organization. b) Project activity to be monitored by faculty members at the University. This activity must guarantee continuous presence and continuity to activities related to project.			
	Unit 4	Submission of evaluation form and final report completed by the intern.			**CO3,CO4**
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.			**CO4,CO5**
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		60%	NIL	40%	
	Text book/s*	NA			
	Other References	NA			

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO) & Program Specific Outcomes (PSO)
1.	CO1: Arrive at work as scheduled, ready to work, and stay for the agreed upon time.	PO1, PO2, PO12, PSO4
2.	CO2: Present yourself in a professional manner at all times, including being appropriately dressed for your workplace	PO1, PO12, PSO1, PSO4
3.	CO 3: Communicate any concerns with your supervisor and the internship coordinator in a timely manner and respectfully	PO1, PO2, PO12, PSO2, PSO4
4.	CO 4: Demonstrate enthusiasm and interest in what you are doing; ask questions and take initiative as appropriate.	PO1, PO12, PSO2, PSO4
18.	CO 5. Exposure to professional and ethical responsibility	PO1, PO6, PO8, PO12, PSO2, PSO4

PO and PSO mapping with level of strength for Summer Internship-III(Course Code CSP 499)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
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	-

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

Syllabus: CSP 498, Major Project - 2

School: SET		**Batch: 2019-2023**			
Program: B.Tech		**Current Academic Year: 2019-2020**			
Branch: CSE / IT		**Semester: VIII**			
1	Course Code	**CSP498** Course Name: Major Project -2			
2	Course Title	Major Project -2			
3	Credits	8			
4	Contact Hours (L-T-P)	0-0-0			
	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: To identify the test procedure for each implemented module CO2: To perform testing using test techniques associated with the white box and black box test-approach methods CO3: To deploy and justify the project after successful testing CO4: Use different tools forcommunication, testing andreport writing. CO5:Enhancing the technical skill and report writing. CO6: To provide a goodtraining for the students in R&D work and technical leadership.			
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	Testing of the modules, Use of appropriate tools/techniques for testing			CO1, CO2
	Unit 2	Deploy & demonstrate developed modules of the project			CO1, CO2, CO3
	Unit 3	Preparing a Project Report in the standard format for being evaluated by the Supervisor			CO4, CO5, CO6
	Unit 4	Submission of Project and Report to Departmental Committee			CO4, CO5, CO6
	Unit 5	Final Presentation before Departmental Committee			CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		60%	NA	40%	
	Text				

	book/s*		
	Other References		

CO and PO Mapping

S. No.	Course Outcome	Program Outcomes (PO)
1.	CO1: To start the actual implementation of the project work to produce the deliverables. To design and implementsolutions to open-endedproblem/project.	PO1, PO2, PO3, PO4, PO5, PO8, PO9, PO10, PO11, PO12
2.	CO2: To identify the test procedure for each implemented module	PO1, PO2, PO4, PO7, PO9, PO10, PO11, PO12
3.	CO3: To perform testing using test techniques associated with the white box and black box test-approach methods	PO1, PO2, PO3, PO6, PO5, PO9, PO10, PO11, PO12
4.	CO4: To deploy and justify the project after successful testing	PO1, PO2, PO3, PO6, PO7, PO9, PO10, PO11, PO12
5.	CO5:Use different tools forcommunication, design,implementation, testing andreport writing.	PO1, PO2, PO3, PO4, PO5, PO7, PO9, PO10, PO11, PO12
6.	CO6: To provide a goodtraining for the students in R&D work and technical leadership.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12

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
CO1	3	2	3	3	3	-	-	2	3	3	2	3
CO2	3	2	3	3	3	-	2	-	3	3	2	3
CO3	3	2	3	-	3	3	-	-	3	3	2	3
CO4	3	2	3	-	-	2	2	-	3	3	2	3
CO5	3	2	3	3	3	-	2	2	2	3	3	3
CO6	3	2	3	3	3	1	2	2	2	3	3	3

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