Programme Structure

Sharda School of Engineering & Technology

Department of Electrical, Electronics and Communication Engineering

B.Tech. in Electronics and Computer Engineering

Programme Code: SET0511

Batch: 2023-2027

Sharda School of Engineering & Technology

B.Tech. ENC Engineering
Batch: 2023-2027
TERM: I

S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	CSE113	Programming for Problem Solving	3	0	0	3	Basics of Computers	SEC
2	EEE112	Principles of Electrical and Electronics Engineering	3	0	0	3	Physics	CC
3.	CVL103	Environmental Studies	2	0	0	0	Science	SC
4.	MTH141	Calculus, Analysis, and linear Algebra	3	1	0	4	Math's	SC
5.	PHY125	Engineering Physics (Semiconductor Physics)	3	1	0	4	Intermediate Physics	SC
Practical/Viva-Voce								
6.	CSP113	Programming for Problem Solving Lab	0	0	2	1	Computer operations	CC
7.	ECP110	CADD Lab	0	0	3	1.5	Physics	SEC
8.	ECP101	Tinkering Lab	0	0	2	1	Physics	SEC C
9.	PHY161	Engineering Physics (Semiconductor Physics) lab	0	0	2	1	Physics	SC
10.	ARP101	Communicative English-I	0	0	4	2	English	CC
11.	EEP112	Principles of Electrical and Electronics Engineering Lab	0	0	2	1	Physics	CC
TOTAL CREDITS						21.5		

Sharda School of Engineering & Technology

B.Tech-ECE Engineering
Batch: 2023-2027
TERM: II

S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course* 1.CC 2. AECC 3. SEC 4.DSE
			L	T	P			
Theory Subjects								
1.	CSE114	Application based Programming in Python	3	0	0	3	C-Programming	SEC
2.	MTH143	Diff. Equation Special T &Comp variables	3	1	0	4	Mathematics	SC
3.	HMM111	Human Values and Ethics	2	0	0	2	Moral Values	SC
4.	ECE121	Circuit designing and PCB layout	1	0	0	1	Basics Physics	CC
5.	ECE240	Digital System Design	3	0	0	3	Basics Physics	CC
Practical/Viva-Voce								
6.	CSP114	Application based Programming in Python lab	0	0	2	1	Concepts of Computers	SEC
7.	ECP120	Fault finding and Circuit testing lab	0	0	3	1.5	Basics Physics	SEC
8.	ECP121	Circuit designing and PCB layout lab	0	0	2	1	Basics Physics	PC
9.	ARP102	Communication English -2	0	0	4	2	English	AEC
10.	ECP240	Digital System Design Lab	0	0	2	1	Basics Physics	PC
		TOTAL CREDITS				**19.5**		
Note: Industrial Internship after completion of 2nd semester and will be evaluated in 3rd Semester.								

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology
B.Tech-ENC Engineering
Batch: 2023-2027
TERM: III

S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	IED001	Introduction to Entrepreneurship	2	0	0	2	-	SEC
2.	MTH145	Probability & Statistics (with MATLAB &Sci Lab)	3	1	0	4	Maths	SC
3.	CSE253	Object Oriented Programming using JAVA	2	0	0	0	Computer	CC
4.	CSE242	Data Structures	3	0	0	3	Computer	CC
5.	ECE098	Sensors and Transducers	3	0	0	3	Electronics	CC
6.	ECE237	Analog Circuits –I	3	0	0	3	Electronics	CC
Practical/Viva-Voce								
7.	ARP207	Logical Skills Building and Soft Skills	0	0	4	2		AEC
8.	CSP243	Object Oriented Programming using JAVA Lab	0	0	2	1	Computer	CC
9.	ECP098	Sensors and Transducers Lab	0	0	2	1	Electronics	CC
10.	ECP251	Project Based Learning (PBL) -1	0	0	4	2	Electronics	SEC
11.	CSP242	Data Structures Lab	0	0	2	1	Computer	
12.	ECP294	Summer Internship-I	-	-	-	2	-	SEC
TOTAL CREDITS						**24**		

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology
B.Tech-ENC Engineering
Batch: 2023-2027
TERM: IV

S. No.	Course Code	Course	Teaching Load			Credit	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	CSE251	Theory of Computation	3	1	0	4	Engineering Math	CC
2.	ECE243	Analog Circuits-II	3	1	0	4	Analog Circuit-I	CC
3.	CSE249	Data Base Management System	3	0	0	3	Basic Electronics	CC
4	PE1	Programme Elective-I	3	0	0	3		DSE
5.	BTY223	Introduction to Biology for Engineers	2	0	0	2	Basic Sciences	SC
6.	OE-I	Open Elective-I(NPTEL)	2	0	0	2	-	OE
Practical/Viva-Voce								
7.	ECP290	Project Based Learning (PBL) -2	0	0	4	2	-	SEC
8.	CSP249	Data Base Management System Lab	0	0	2	1	Basic Electronics	CC
9.	ECP237	Analog Circuits lab	0	0	2	1	Digital Electronics	CC
10.	ARP208	Quantitative Aptitude Behavioral and Interpersonal Skills	0	0	4	2	Interpersonal Skills	AEC
TOTAL CREDITS						**24**		
Note: Industrial Internship after completion of 4th semester and will be evaluated in 5th Semester.								

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology
B.Tech-ENC Engineering
Batch: 2023-2027
TERM: V

S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	PE3	Programme Elective-3	3	0	0	3		DSE
2.	CSE354	Design & Analysis of Algorithms	3	0	0	3		CC
3.	CSE355	Software Engineering & Testing Me.	2	0	0	2		
4.	PE2	Programme Elective-2	2	0	0	2	Digital Electronics	DSE
5.	MRM001	Research Methodology	2	0	0	2	-	SC
6.	OE2	Open Elective – 2	3	0	0	3	-	OE
Practical/Viva-Voce								
7.	PE2	Programme Elective-2 Lab	0	0	2	1		CC
8.	ECP351	Technical Skill Enhancement Course-I	0	0	2	1	-	CC
9.	ECP392	Project Based Learning (PBL) -3	0	0	4	2	-	SEC
10.	ARP305	Personality Development and Decision-making Skills	0	0	4	2	-	AEC
11.	ECP395	Industry Connect	-	-	-	2	-	SEC
12.	ECC301	Community Connect	-	-	-	2	-	SEC
TOTAL CREDITS						**25**		

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology

B.Tech-ENC Engineering
Batch: 2023-2027
TERM: VI

S No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	CSE353	Compiler Design	3	0	0	3	Computer	CCC
2.	ECN302	Embedded System and Robotics	2	0	0	2	Microprocessor	C
3.	ECE933	CMOS Design	3	0	0	3	Analog	DSE
4.	PE4	Programme Elective -4	3	0	0	3	Sensors	CC
5.	PE5	Programme Elective -5	2	0	0	2	-	DSE
6.	OE3	Open Elective – 3	2	0	0	2	-	OE
Practical/Viva-Voce								
7.	ARP306	Campus to Corporate	0	0	4	2		AEC
8.	CSP353	Compiler Design Lab	0	0	2	1		
8.	PE5	Programme Elective-5 Lab	0	0	2	1		
9.	EPN302	Embedded System & Robotics Lab	0	0	2	1	Signals & Systems	CC
10.	ECP394	Project Based Learning (PBL) -4	0	0	4	2	-	SEC
11.	ECP365	Technical Skill Enhancement Course-2	0	0	2	1	-	SEC
TOTAL CREDITS						**23**		
Note: Industrial Internship after completion of 6th semester and will be evaluated in 7th Semester.								

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology

B.Tech-ENC Engineering
Batch:2023-2027
TERM: VII

S. No.	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course*: 1. CC 2. AECC 3. SEC 4. DSE
			L	T	P			
Theory Subjects								
1.	PE6	Programme Elective-6	2	0	0	2	-	DSE
2.	PE7	Programme Elective-7	2	0	0	2	-	DSE
3.	HMM305	Management for Engineers	3	0	0	3		CC
4.	OE4	Open Elective – 4	3	0	0	3	-	OE
Practical/Viva-Voce								
6.	ECE491	Major Project- 1	-	-	-	2	-	CC
7.	ECP481	Industrial Internship	-	-	-	2	-	SEC
8.	PE7	Programme Elective-7 Lab	0	0	2	1		
TOTAL CREDITS						**15**	-	

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Sharda School of Engineering & Technology
B.Tech-ECE Engineering
Batch: 2023-2027
TERM: VIII

S. No.	Paper ID	Course Code	Course	Teaching Load			Credits	Pre-Requisite/Co Requisite	Type of Course[8]: 1. CC 2. AECC 3. SEC 4. DSE
				L	T	P			
Practical/Viva-Voce/Jury									
1.		ECE492	Major Project – 2	-	-	-	8	-	SEC
TOTAL CREDITS							**8**	-	

*CC:CoreCourse,AECC:AbilityEnhancementCompulsoryCourses,SEC:SkillEnhancementCourses,DSE:DisciplineSpecificCourses`

Course Modules

TERM-I

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: I**
1	Course Code	**CSE113**
2	Course Title	Programming for problem solving
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	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	After completion of Course Students will be able to: CO1: demonstrate the algorithm, Pseudo-code and flow chart for the given problem. CO2: develop better understanding of basic concepts of C programming. CO3: create and implement logic using array and function. CO4: construct and implement the logic based on the concept of strings and pointers. CO5: apply user-defined data types and I/O operations in file. CO6: design and develop solutions to real world problems using
7	Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm
8	Outline syllabus	
	Unit 1	**Logic Building**
	A	Flowchart: Elements, Identifying and understanding input/ output, Branching and iteration in flowchart
	B	Algorithm design: Problem solving approach (top down/bottom-up approach)
	C	Pseudo Code: Representation of different construct, writing pseudo-code from algorithm and flowchart
	Unit 2	**Introduction to C Programming**
	A	Introduction to C programming language, Data types, Variables, Constants, Identifiers, and keywords, Storage Classes
	B	Operators and expressions, Types of Statements: Assignment, Control, jumping.
	C	Control statements: Decisions, Loops, break, continue
	Unit 3	**Arrays and Functions**
	A	Arrays: One dimensional and multi-dimensional arrays: Declaration, Initialization, and array manipulation (sorting, searching).

	B	Functions: Definition, Declaration/Prototyping and Calling, Types of functions, Parameter passing: Call by value, Call by reference.		
	C	Passing and Returning Arrays from Functions, Recursive Functions.		
	Unit 4	**Pre-processors and Pointers**		
	A	Pre-processors: Types, Directives, Pre-processor Operators (#,##,\) , Macros: Types, Use, predefined Macros		
	B	Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.		
	C	String: Introduction, predefined string functions, Manipulation of text data, Command Line Arguments.		
	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.		
	B	Files: Introduction, concept of record, I/O Streaming and Buffering, Types of Files: Indexed file, sequential file and random file,		
	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.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Textbook/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 3rdEdition .ISBN 9780070145900 2. E. Balagurusamy - Programming in ANSI C – 8thEdition - Tata McGraw Hill- 2019		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: I**
1	Course Code	EEE112
2	Course Title	Principles of Electrical and Electronics Engineering
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Compulsory
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques, and equipment's used in engineering applications.
6	Course Outcomes	After completion of Course Students will be able to: CO1: Analyze and solve basic electrical circuits. CO2: Explain the working principle of transformer and identify its applications. CO3: Illustrate the working principle of dc and ac motors and identify the starting methods of single-phase induction motor. CO4: Apply the basics of diode to describe the working of rectifier circuits such as half and full wave rectifiers. CO5: Apply the concepts of basic electronic devices to design various circuits CO6: Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.
8	Outline syllabus	
	Unit 1	**DC & AC Circuits**
	A	Electrical circuit elements (R, L and C), series and parallel circuits, concept of equivalent resistance, Kirchhoff current and voltage laws, star-delta conversion
	B	Analysis of simple circuits with dc excitation and Superposition Theorem, Representation of sinusoidal waveforms, peak and rms values, real power, reactive power, apparent power, power factor
	C	Introduction to three phase system, relationship between phase voltages and line voltages,
	Unit 2	**Transformer**

	A	Working principle and construction of transformer, EMF Equation		
	B	Efficiency of transformer, Power and distribution transformer and difference between them		
	C	Transformer applications in transmission and distribution of electrical power		
	Unit 4	**Electrical Motors**		
	A	Construction, working principle, torque-speed characteristic. and applications of dc motor.		
	B	Construction, working principle and applications of a three- phase induction motor, significance of torque-slip Characteristic		
	C	Working principle starting methods and applications of single phase induction motor		
	Unit 4	**Semiconductor Diode and Rectifier**		
	A	PN junction and its biasing		
	B	Semiconductor diode, ideal versus practical diode , VI characteristics of diode		
	C	Half wave and full wave rectifiers with and without filters.		
	Unit 5	**Transistors**		
	A	Bipolar Junction Transistor (BJT) –Construction, working, principle and input-output characteristics		
	B	BJT as CE amplifier and as a switch		
	C	Introduction to JFET		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010- ISBN: 1259081532, 9781259081538 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson Publication,2011 ISBN-8131754561, 9788131754566 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" Pearson Education, 201311th edition ISBN- 9780136064633		
	Other References	1. V. D. Toro, "Electrical Engineering Fundamentals" Prentice Hall India, 2003 ISBN 9789332551763		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: I**
Course Code	MTH 141
Course Title	Calculus, Analysis and Linear Algebra
Credits	4
Contact Hours (L-T-P)	3-1-0
Course Status	Compulsory
Course Objective	The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis 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.
Course Outcomes	The student is able to CO1: Explain the concept of differential calculus, illustrate the curvature and Maxima, minima, and saddle point by using Method of Lagrange. CO2: Explain the concept of integral calculus, describe Beta and Gamma function, calculate multiple integration, and evaluate area and volume. CO3: Describe the concept of sequence and series; discuss the test of convergence to evaluate convergence of series. CO4: Discuss the basic of vector calculus; illustrate gradient, curl and divergence. CO5: Describe and use the concepts line and surface integral for scalar and vector, explain the Green theorem. CO6: Explain the basic concepts matrices and determinate, evaluate system of linear equation by using rank and inverse method, calculate Eigen values and Eigen vectors; Diagonalization of matrices; Cayley -Hamilton Theorem.
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, sequence and series, vector calculus and linear algebra.

Outline Syllabus	
Unit 1	**Differential Calculus**
A	Differentiation, Taylor's and Maclaurin's theorems with remainders; indeterminate forms and L' Hospital's rule;
B	Limits and continuity for multivariable and Partial derivatives, Euler's theorem total derivative; Tangent plane and normal line (basic concepts);
C	Expansion of functions of several variables, Maxima, minima and saddle points; Method of Lagrange multipliers.
Unit 2	**Integral Calculus**
A	Beta and Gamma functions and their properties; Multiple,

	Integration: Double integrals (Cartesian), change of order of integration in double integrals		
B	Change of variables (Cartesian to polar), Applications:areas and volumes, Center of mass		
C	Triple integrals (Cartesian), Simple applications of triple integration.		
Unit 3	**Sequences and series**		
A	Convergence of sequence and series,		
B	tests for convergence: comparison test, D' Alembert's ratio test,		
C	Raabe's test, Cauchy root test; Power series.		
Unit 4	**Vector Calculus**		
A	Gradient, curl and divergence, Scalar line integrals,		
B	vector line integrals, scalar surface integrals,		
C	vector surface integrals, Theorems of Green's theorem.		
Unit 5	**Matrices**		
A	Inverse and rank of a matrix, System of linear equations,		
B	Symmetric, skew-symmetric and orthogonal matrices; Determinants		
C	Eigen values and Eigen vectors; Diagonalization of matrices; Cayley - Hamilton Theorem.		
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	25%	25%	50%
Text book/s*	1. Kreyszig, E., "Advanced Engineering Mathematics", John Wiley & Sons Inc. - ISBN 978-0-470-45836-5 2. Jain, M.K., and Iyengar, S.R.K., "Advanced Engineering Mathematics", Narosa Publications 2007		
Other References	1. Simmons, G.F., "Differential Equations with applications with applications", Tata McGraw-Hill.- second edition 2003 ISBN 10: 0070573751ISBN 13: 9780070573758		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: I**
1	Course Code	PHY125
2	Course Title	Engineering Physics (Semiconductor Physics)
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	Compulsory
5	Course Objective	To make students proverbial with the fundamental concepts of Semiconductors materials and their real- l i f e applications for configuring various electronics devices.
6	Course Outcomes	After the completion of this course, student will be able to CO1: Explain the various fundamental theories of materials and concept of solid classification. CO2: Illustrate the fundamental concepts of mobility, conductivity, electrons and holes in an intrinsic semiconductor, Donor and Acceptor impurities (n-type and p-type semiconductor), Fermi levels etc. CO3: Interpret formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode etc. CO4: Compare of Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation, population inversion and pumping, etc. CO5: Explain the operation of optical sources: Light emitting diode (construction, basic working principle), semiconductor laser (construction, basic working principle), and optical detectors. CO6: Illustrate 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	
	Unit 1	**Physics of Semiconductor**
	A	Introduction, classical free electron theory (Lorentz-Drude theory and limitations), Quantum theory of free electron
	B	(Fermi energy, effect of temperature on Fermi-Dirac distribution)(qualitative analysis)
	C	Energy bands, Classification of Solids on the basis of energy band.
	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)

	B	Fermi levels, carrier densities in semiconductor		
	C	Concentration of electrons in conduction band and holes in valence band, Drift and diffusion current, Hall effect.		
	Unit 3	**P-N Junction**		
	A	P-N junction, types of p-n junction (step-graded and Linearly-graded junction)		
	B	Formation of depletion region, barrier potential, Zener diode, Characteristics of Zener diode		
	C	Avalanche and Zener breakdown, comparison of Zener diode And PN junction diode, concept of tunneling, I-V characteristics of tunnel diode.		
	Unit 4	**Laser Physics**		
	A	Coherent sources, interaction of radiation with matter (spontaneous and stimulated emission), Einstein's relation		
	B	Population inversion and pumping, active components of laser, optical amplification or gain		
	C	Threshold condition for laser action, three and four level lasers, Ruby and He-Ne lasers.		
	Unit 5	**Optoelectronic Devices**		
	A	Optical sources: Light emitting diode (construction, basic working principle)**,** semiconductor laser (construction, basic working principle)		
	B	Optical detectors: photodiode (working principle), p-i-n photodiode (working principle),		
	C	Photovoltaic effect, p-n junction solar cell (basic working idea).		
	Mode of Examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text books	Integrated Electronics- Millman - Halkias, Tata McGraw Hill		
	Other References	1. Semiconductor Devices Physics and Technology- S M Sze, John Wiley & Sons -ISBN: 978-0-470-53794-7 Semiconductor Device Fundamentals- Robert F. Pierret Addison Wesley Longman –ISBN:0201543931		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: I**
Course Code	CSP113
Course Title	Programming for problem solving lab
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
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
Course Outcomes	After Completion of Course Students will be able to: CO1: Demonstrate the algorithm, Pseudo-code and flow chart for the given problem. CO2: Develop better understanding of basic concepts of C programming. CO3: Create and implement logic using array and function. CO4: Construct and implement the logic based on the concept of strings and pointers. CO5: Apply user-defined data types and I/O operations in file. CO6: Design and develop solutions to real world problems using C.
Course Description	Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm
Outline syllabus	
Unit 1	**Logic Building**
A	Draw flowchart for finding leap year
B	Write a c Program to Add Two Integers
C	Write a Program to create a calculator
Unit 2	**Introduction to C Programming**
A	Write a c Program to convert length meter to cm
B	Write a c Program to convert temp
C	Write a c Program to swap two numbers
Unit 3	**Arrays and Functions**
A	Write a c Program to calculate the average using arrays
B	Write a c Program to find the largest element of the array
C	Write a c Program to find the smallest element of the array
Unit 4	**Pre-processors and Pointers**
A	Write a c Program to swap two values using pointers
B	Write a c Program to find largest number from array using pointers

C	Write a c Program to find smallest number from array using pointers		
Unit 5	**User Defined Data Types and File Handling**		
A	Write a c Program to store information of a student using Structure		
B	Write a c Program to store information of a student using Union		
C	Write a c Program to store information of a student using Class		
Mode of examination	Practical		
Weightage Distribution	CA	CE	ETE
	25%	25%	50%
Text book/s*	Kernighan, Brian, and Dennis Ritchie. The CProgramming Language		
Other References	1. E. Balagurusamy - Programming in ANSI C – 8thEdition -Tata McGraw Hill- 2019 ISBN- 0070681821		

-

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: I**
Course Code	ECP110
Course Title	CADD Lab
Credits	1.5
Contact Hours (L-T-P)	0-0-3
Course Status	Compulsory
Course Objective	The objective of this introductory course is to make students familiar with computer-aided drafting/ design, introduce them about the basic commands, tools and dimension techniques for creation and presentation of various engineering drawing by using AutoCAD software which helps in visualization and problem solving in engineering disciplines.
Course Outcomes	After successful completion of this course the student will be able to: CO1: Understand the fundamental features of AutoCAD workspace and user interface. CO2: Apply the fundamental tools such as draw, edit, and view for creating two-dimensional engineering drawings in AutoCAD. CO3: Choose advanced features to present an engineering drawing in AutoCAD. CO4: Apply text and dimension features in the engineering drawing CO5: Create different orthographic projections from a pictorial view. CO6: Analyze an engineering drawing and use the software packages for drafting and modeling.
Course Description	This introductory course is offered to students to make them proficientin design, layout, product development, and other careers that require technical drawing. Using the current version of the AutoCAD software, students will learn a variety of drawing techniques and be able to replicate specific drawings in multiple perspectives. The pinnacle of the class is to empower and enable students to create using the software provided. Career opportunities and 3-D modelling, manufacturing, and engineering will also be explored. No drafting or computer experience is necessary.

Outline syllabus

List of Experiments	
Experiment 1	Introduction to AutoCAD and its interface with assignment1
Experiment 2	Working with coordinates, drawing of line, circle, arc, polygon and creating sketches by using them assignment2
Experiment 3	Editing of drawing by using editing Tools and Power toolswith assignment 3

Experiment 4	Creating of advanced feature like fillet, chamfer, hatch and using of reusable items with assignment 4		
Experiment 5	Representing text and dimensioning in AutoCAD with assignment 5		
Experiment 6	Creating the drawing of the given assignment 6 by using AutoCAD features.		
Experiment 7	Creating the drawing of the given assignment 7 in AutoCAD.		
Experiment 8	Creating the drawing of the given diagram and giving dimensions in AutoCAD.		
Experiment 9	Creating the drawing of TajMahal in AutoCAD 2D		
Experiment 10	Creating of orthographic projections from a 3D figure		
Mode of examination	Practical		
Weightage Distribution	CA	CE	ETE
	25%	25%	50%
Text book/s*	1. Ibrahim Zaid, "CAD/CAM- Theory and Practice", McGrawHill, International Edition. ISBN 0–07–072857–7		
Software	AutoCAD		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: I**
Course Code	ECP101
Course Title	Tinkering Lab
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
Course Objective	To be acquainted with hardware's in Consumer Electronics goods
Course Outcomes	After successful completion of this course the student will be able to: CO1: Identify and explain the parts of Cell phone charger CO2: Identify and describe the parts of Mobile phones CO3: Interpret the need of USB CO4: Explain and Identify the parts of Speakers CO5: Identify and describe the parts of Computers CO6: Apply the hardware knowledge for different projects.
Course Description	Justify and enhance their knowledge on consumer products

	Outline syllabus	
	Unit 1	**Inside Cell phone Charger**
	A	Unscrew
	B	Identifying parts
	C	Working
	Unit 2	**Mobile phones**
	A	Unscrew
	B	Identifying parts
	C	Working
	Unit 3	**USB**
	A	Basics
	B	Inside USB cable/Port
	C	Working
	Unit 4	**Speakers**
	A	Unscrew
	B	Identifying parts
	C	Working
	Unit 5	**Computers**
	A	Unscrew
	B	Identifying parts ,Working
	C	Screw up
	Mode of examination	Practical & Viva

	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	Lab Manuals		
	Other References	https://www.youtube.com/watch?v=WNRzU5DLA0I https://www.youtube.com/watch?v=jghFENiUsBI		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: I**
Course Code	PHY 161
Course Title	Physics Lab 1
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
Course Objective	To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
Course Outcomes	On successful completion of the course the students will be able to CO1: Explain of basic physics experiments based on simple harmonic motion CO2: Apply the concept of stress, strain to calculate modulus of rigidity, Young's modulus.CO3: Illustrate the moment of inertia of different bodies. CO4: Explain and draw characteristic curves of different electronic components CO5: Apply the concept of frequency using Melde's Experiment CO6: Apply the mathematical concepts/equations to obtain quantitative results and ability to conduct, analyze and interpret experiments

Outline Syllabus

Unit 1	
A	To verify the relation of time period using simple pendulum.
B	To determine the acceleration due to gravity and radius of pendulum
C	Gyration of compound pendulum and compare with theoretical value.
Unit 2	
A	To measure the moment of inertia of a flywheel.
B	To determine the young's modulus of a beam using cantilever beam experiment apparatus
C	To determine vertical distance between two points using sextant.
Unit3	
A	To set up the experiment the modulus of rigidity of a material of a given wire with an inertia table (torsion pendulum) by dynamical method.
B	To determine the modulus of rigidity of a material of a given wire with an inertia table (torsion pendulum) by dynamical method.
C	To calculate Moment of inertia of different irregular shapes.
Unit 4	
A	To determine the frequency of an electrically maintained tuning fork using Melde's Apparatus. Transverse mode of vibration
B	To determine the frequency of an electrically maintained tuning fork using Melde's Apparatus Longitudinal mode of vibration.
C	To determine the coefficient of viscosity of water by Poiseuille's method.

	Unit 5			
	A	To draw the characteristic curve of a PN junction diode.		
	B	To trace the circuit of a Half Wave Rectifier circuit		
	C	Determine efficiencies and ripple factors with capacitor		
	Mode of Examination	Practical/Viva		
	Weightage Distribution	CA	CE	ESE
		25%	25%	50%
	Text books	1. B.Sc. Practical Physics- Harnam Singh, S. Chand Publishing. B.Sc. Practical Physics- C L Arora, S. Chand Publishing.		
	Other References	1. GeetaSanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: I**
Course Code	**ARP101**
Course Title	Communicative English-1
Credits	2
Contact Hours (L-T-P)	1-0-2
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.
Course Outcomes	CO1 Develop a better understanding of advanced grammar rules and write grammatically correct sentences. CO2 Acquire wide vocabulary and punctuation rules and learn strategies for error- free communication. CO3 Interpret texts, pictures and improve both reading and writing skills which would help them in their academic as well as professional career. CO4 Comprehend language and improve speaking skills in academic and social contexts. CO5 Develop, share and maximise new ideas with the concept of brainstorming and the documentation of key critical thoughts articulated towards preparing for a career based on their potentials and availability of opportunities. CO6 Function effectively in multi-disciplinary teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality
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.

Outline syllabus – ARP 101

UNIT 1	**Sentence Structure**
A	Subject Verb Agreement
B	Parts of speech
C	Writing well-formed sentences
Unit 2	Vocabulary Building & Punctuation
A	**Homonyms/ homophones, Synonyms/Antonyms**
B	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)
C	Conjunctions/Compound Sentences
Unit 3	Writing Skills
A	Picture Description – Student Group Activity

B	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		
C	Story Completion Exercise –Building positive attitude -The Man from Earth (Watching a Full length Feature Film), Digital Literacy | Effective Use of Social Media		
Unit 4	Speaking Skill		
A	Self-introduction/Greeting/Meeting people – Self Branding		
B	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)		
C	**Dialogues/conversations (Situation based Role Plays)**		
Unit 5	Professional Skills | Career Skills		
A	Exploring Career Opportunities		
B	Brainstorming Techniques & Models		
C	Social and Cultural Etiquettes, Internal Communication		
Unit 6	Leadership and Management Skills		
A	Managerial Skills		
B	Entrepreneurial Skills		
C	Case Study		
Evaluations	CA	CE	ESE
	25%	25%	50%
Texts & References | Library Links	Blum, M. Rosen. How to Build Better Vocabulary.London: Bloomsbury Publication Comfort, Jeremy (et.al). Speaking Effectively.Cambridge University Press		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: I**
1	Course Code	EEP112
2	Course Title	Principles of Electrical and Electronics Engineering Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	To provide the students with an introductory concept in the field of electrical and electronics engineering to facilitate better understanding of the devices, techniques and equipment's used in engineering applications.
6	Course Outcomes	After successful completion of this course the student will be able to: CO1:Configure and analyze any given circuit. CO2:Apply the working of transformer and calculate its efficiency CO3: Explain the working of dc and ac motors and measure its various operating parameters. CO4:Design rectifier circuits such as half and full wave rectifiers and observe its output waveforms. CO5: Evaluate the characteristics of BJT. CO6:Apply the basic concepts in Electrical and Electronics Engineering for multi-disciplinary tasks.
7	Course Description	This initial course introduces the concepts and fundamentals of electrical and electronic circuits and devices. Topics include basic circuit analysis, diode and transistor fundamentals and applications. This course also introduces working principle and applications of dc/ac motors and transformers.
8	Outline syllabus	
	Unit 1	**Practical based on DC & AC Circuits**
	A	To configure a dc circuit on breadboard, and measure voltage/current across/through each element
	B	To verify Kirchhoff's Laws, To verify superposition theorem
	C	To find the real power, reactive power, apparent power and power factor of RL & RC load
	Unit 2	**Practical related to Transformers**
		To find the efficiency of transformer by obtaining its losses.
	Unit 3	**Practical related to Electrical Motors**
	A	To study cut-section of DC motor and induction motor.
	B	To start the DC motor and reverse its direction of rotation.
	C	To start an induction motor and reverse its direction of rotation.
	Unit 4	**Practical related to Diode and Rectifier**
	A	To determine voltage-current characteristic of diode
	B	To assemble and test half wave rectifier circuits for their input and output waveform

	C	To assemble and test full wave rectifier circuits for their input and output waveform		
	Unit 5	**Practical related to Transistors**		
	A	To determine input and output characteristics of BJT		
	B	Validation of BJT as a switch		
	C	Validation of BJT as an amplifier		
	Mode of examination	Practical/viva		
	Weightage Distribution	CA	CE	ESE
		25%	25%	50%
	Text book/s*	1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", TataMcGraw Hill, 2010-ISBN:9780070146112 2. S. K. Bhattacharya, "Basic Electrical and Electronics Engineering",Pearson Publication.ISBN: 9789332586505 3. Robert L Boylestad, "Electronic Devices and Circuit Theory" Pearson Education, 2009 ISBN: 9780131189058		

TERM-II

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: II**
1	Course Code	CSE114
2	Course Title	Application Based Programming in Python
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	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 Programme design. CO2. Demonstrate the use of Python lists, tuples and dictionaries. CO3. Implement methods and functions to improve readability of programs.CO4. Describe and apply object-oriented programming methodology. CO5. Apply top-down concepts in algorithm design. CO6. Apply 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	
	Unit 1	**Introduction**
	A	History, Python Environment, Variables, Data Types, Operators.
	B	Conditional Statements: If, If- else, Nested if-else. Looping: For, While, Nested loops.
	C	Control Statements: Break, Continue, And Pass. Comments
	Unit 2	**List, Tuple and Dictionaries**
	A	Lists and Nested List: Introduction, Accessing list, Operations, Working with lists, Library Function and Methods with Lists.
	B	Tuple: Introduction, Accessing tuples, Operations, Working, Library Functions and Methods with Tuples.
	C	Dictionaries :Introduction, Accessing values in dictionaries, Working with dictionaries, Library Functions
	Unit 3	**Functions and Exception Handling**
	A	Functions: Defining a function, Calling a function, Types of functions, Function Arguments

	B	Anonymous functions, Global and local variables		
	C	Exception Handling: Definition Exception, Exception handling Except clause, Try? finally clause		
	Unit 4	**OOP and File Handling**		
	A	OOPs concept : Class and object, Attributes, Abstraction, Encapsulation, Polymorphism and Inheritance		
	B	Static and Final Keyword, Access Modifiers and specifiers, scope of a class		
	C	User Defined Exceptions		
	Unit 5	**Module and Applications**		
	A	Modules: Importing module, Math module, Random Module		
	B	Matplotlib, Packages		
	C	Applications: Searching Linear Search, Binary Search. Sorting: Bubble Sort		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	The Complete Reference Python, Martin C. Brown, McGrwHill ISBN:9780072127188		
	Other References	1. Introduction to computing in problem solving using Python,E Balahurusamy, McGrwHill- ISBN:9789352604173 2. Introduction to programming using Python, Y. Daniel Liang,Pearson-ISBN:9780132747189		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: II**
Course Code	MTH 143
Course Title	Differential Equations, Special Transforms & Complex Variable
Credits	4
Contact Hours (L-T-P)	3-1-0
Course Status	Compulsory
Course Objective	To make students familiar with the solutions of first- & second-degree ODE along with solution of PDE by method of separation of variable. The concepts & application of Laplace & Fourier transform is also introduced with the Fourier series. And at last differentiation of complex variable, Counter integration, Taylor's & Laurent's series expansion will be included.
Course Outcomes	Students will be able to: CO1: Solve the Ordinary differential equation of first order & second order linear differential equations with constant coefficients, Method of variation of parameters,Cauchy-Euler equation, Power series solutions. CO2: Classify Partial differential equation, Solution of Wave equation, Heatequation and Laplace equation using method of separation of variables. CO3: Apply the Laplace transform of some standard functions and its properties, Inverse Laplace transform and Convolution theorem. Introduction to Z transforms.CO4: Evaluate Fourier series with change of interval, Half range sine and cosine series. CO5: Apply Fourier Transforms, Fourier Cosine and sine Transform withproperties of Fourier Transform. CO6: Explain Differentiation, Analytic functions, Cauchy-Riemann equations,Harmonic functions,
Unit No.	Outline syllabus

	Unit 1	**ORDINARY DIFFERENTIAL EQUATION**		
	A	Exact differential equations		
	B	Second order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy-Euler equation		
	C	Power series solutions		
	Unit 2	**PARTIAL DIFFERENTIAL EQUATIONS**		
	A	Definition, Classification of Partial differential equation, Method of separation of variables		
	B	Solution of Wave equation, Heat equation using Method of separation of variables		
	C	Laplace equation using Method of separation of variables		
	Unit 3	**LAPLACE TRANSFORM AND Z TRANSFORM**		
	A	Laplace transform of some standard functions and its properties		
	B	Inverse Laplace transform and Convolution theorem.		
	C	Introduction to Z transforms		
	Unit 4	**FOURIER SERIES AND FOURIER TRANSFORM**		
	A	Fourier series in change of interval, Half range sine and cosine Series		
	B	Fourier Transforms, Fourier Cosine and sine Transform		
	C	Properties of Fourier Transform		
	Unit 5	**COMPLEX VARIABLE**		
	A	Differentiation, Analytic functions, Cauchy-Riemann equations, Harmonic functions		
	B	Contour integrals, Cauchy-Integral theorem, Cauchy Integral formula (without proof)		
	C	Taylor's series and Laurent's series (without proof)		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.		
	Other References	• W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., WileyIndia, 2009. • S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984. • E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995. • E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: II**
1	Course Code	ECE121
2	Course Title	Circuit Designing and PCB Layout
3	Credits	1
4	Contact Hours (L – T – P)	1-0-0
	Course Status	Compulsory
5	Course Objective	To provide the students with an introductory concept about the steps involvedin the design of circuits and to provide the students with more hands-on experience and also enable them to develop and test simple PCB circuits. Selection of components, wiring, soldering, desoldering, testing andtroubleshooting are some of the basic skills acquired by the students.
6	Course Outcomes	**CO1:** Illustrate the basics of semiconductor material and most commonlyused electronic components. **CO2:** Apply various circuit analysis techniques for designing basic circuitsusing commonly used electronic components. **CO3:** Explain the basics of PCB designing. **CO4:** Apply advance techniques, skills and modern tools for designing andfabrication of PCBs. **CO5:** Apply the knowledge and techniques to fabricate Multilayer, SMT andHDI PCB. **CO6:** Design Circuits and PCB Layout using hardware and software techniques.
7	Course Description	This initial course introduces the concepts and fundamentals of steps involvedin the design of any circuit. Topics include basic circuit design steps, diode and transistor fundamentals and applications. This course also introduces to printed circuit boards (PCBs), their types and steps involved in obtaining thePCB layout.
8	Outline Syllabus	
	UNIT-I	**Electronics Fundamentals:**
	A	Material classification based on conductivity, Basic Semiconductors, Diodes, Characteristics of Diodes, Classification of Diodes.
	B	Transistors, Classification of Transistors, BJT characteristics, JFET &MOSFET Characteristics, Transistor Amplification Circuits
	C	OP Amp, Basic Characteristics of OP Amp, Feedback circuits, Introductions to Digital circuits.
	UNIT-II	**Fundamentals of Circuit Design:**
	A	Basic Circuit Laws, Current and Voltage Division Rules, Introduction to Linear and Non-linear elements, Classification of Sources, EquivalentImpedance, Calculations in Series and Parallel Circuits.
	B	Basic Network Theorems, Current, Voltage and Power calculations in a Circuit, Diode Applications

	C	Clipping and Clamping Circuits with Diodes, Rectifier Circuits		
	UNIT-III	**Introduction to Printed Circuit Board:**		
	A	Fundamental of electronic components, basic electronic circuits,		
	B	Basics of printed circuit board designing: Layout Planning, General rules andParameters,		
	C	Ground Conductor Considerations, Thermal Issues, Check and Inspection ofArtwork.		
	UNIT-IV	**Design Rules for PCB and PCB Technology Trends:**		
	A	Design rules for Digital Circuit PCBs, Analog Circuit PCBs, High Frequencyand Fast Pulse Applications, Power Electronic and Microwave Applications		
	B	Multilayer PCBs, Multiwire PCBs, Flexible PCBs, Surface mount PCBs,		
	C	Reflow soldering, Introduction to High-Density Interconnection (HDI)Technology.		
	UNIT-V	**Introduction to Electronic design automation (EDA) tools for PCBdesigning:**		
	A	Brief Introduction of various simulators, SPICE and PSPICE Environment,Selecting the Components Footprints as per design.		
	B	Making New Footprints, Assigning Footprint to components, Net listing, PCBLayout Designing, Auto routing and manual routing.		
	C	Assigning specific text (silkscreen) to design, creating report of design,creating manufacturing data (GERBER) for design.		
	Mode of Examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text Book/s*	1. Printed circuit board design, fabrication assembly and testing, by R. S. Khandpur, Tata McGraw Hill, 2006. ISBN No.: 9780070588141. 2. Robert Boylestad, Electronic Devices and Circuit Theory, Pearson Education, 2019. ISBN: 9780133109047. 3. Complete PCB Design Using OrCAD Capture and PCB Editor, Kraig Mitzner Bob Doe Alexander Akulin Anton Suponin Dirk Müller, 2nd Edition 2009. ISBN: 9780128176849.		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: II**
1	Course Code	ECE240
2	Course Title	Digital System Design
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Compulsory
5	Course Objective	1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. 2. To prepare students to perform the analysis and design of various digital electronic circuits.
6	Course Outcomes	After successful completion of this course the student will be able to: CO1: Explain combinational logic circuits CO2: Analyze modular combinational circuits with MUX/DEMUX,Decoder, Encoder CO3: Illustrate synchronous sequential logic circuits. CO4: Apply HDL & appropriate EDA tools for digital logic design and simulation. CO5: Apply HDL for the functional verification of FSM. CO6: Design a combinational circuit with given conditions
7	Course Description	This course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, medium scale integration (MSI) and large scale integration (LSI) circuits, analog to digital (AD) and digital to analog (DA) conversion, and other related topics. Upon completion, students should be able to construct, analyse, verify, and troubleshoot digital circuits using appropriate techniques and test equipment.
8	Outline syllabus	
	Unit 1	**Logic Simplification**
	A	Review of Boolean Algebra and De-Morgan‟s Theorem, SOP & POS forms.
	B	Canonical forms, Karnaugh maps up to 5 variables
	C	Binary codes, Code Conversion.
	Unit 2	**Combinational Logic Design**
	A	Half and Full Adders, Subtractors, Serial and Parallel Adders
	B	Parity Generator-Even and Odd, ALU
	C	MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display

	Unit 3	**Sequential Logic Design**		
	A	Building blocks like S-R, D,JK,T and Master-Slave JK FF, Edge triggered FF		
	B	Ripple Counter, Synchronous counters, Shift registers		
	C	Finite state machines, Design of synchronous FSM, Designing synchronous circuits like Pulse train generator, Pseudo Random Binary Sequence generator, Clock Generation		
	Unit 4	**Logic Families and Semiconductor Memories**		
	A	TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, ECL, CMOS families		
	B	Memory elements, Concept of Programmable logic devices like PLDs, FPGA.		
	C	Logic implementation using Programmable Devices.		
	Unit 5	**VLSI Design flow**		
	A	Design entry: Schematic, FSM & HDL, different modelling styles in HDL		
	B	Data types and objects, Dataflow, Behavioural and Structural Modelling.		
	C	Synthesis and Simulation HDL constructs and codes for combinational and sequential circuits.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Digital Logic and Computer Design by Marris Mano- ISBN:9788120304178 1979		
	Other References	1. Douglas Perry, “VHDL”, Tata McGraw Hill, 4th edition, 2002- ISBN: 9780071400701 . 2. D.V. Hall, “Digital Circuits and Systems”, Tata McGraw Hill, 1989- ISBN: 9780471301592 3.R.P. Jain, “Modern digital Electronics”, Tata McGraw Hill,4th edition,2009 ISBN: 9780070534766		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
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 languageconstructs 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 Programme design. CO2. Demonstrate the use of Python lists, tuples and dictionaries CO3. Implement methods and functions to improve readability of programs. 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	
	Unit 1	**Practical based on conditional statements and control structures**
	A	1. Programme to implement all conditionalstatements 2. Programme to implement different controlstructures
	B	
	Unit 2	**Practical related to List, Tuples and dictionaries**
	A	1. Programme to implement operations on lists 2. Programme to implement operations onDictionary 3. Programme to implement operations on Tuple
	B	
	Unit 3	**Practical related to Functions and Exception Handling**
	A	1. Programme to implement Exception Handling 2. Programme to use different functions
	B	
	Unit 4	**Practical related to Object Oriented Programming**
	A	1. Program to use object oriented concepts like

	B	inheritance, overloading polymorphism etc. 2. Programme for file handling		
	Unit 5	**Practical related to Modules and Applications**		
	A	1. Programme to use modules and package 2. Programme to implement searching andsorting		
	B			
	Mode of examination	Practical/Viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	The Complete Reference Python, Martin C. Brown, McGraw Hill,2010-ISBN:9780072127188		
	Other References	1. Introduction to computing in problem solvingusing Python, E Balagurusamy, McGraw Hill ISBN- 9789353160920 2. Introduction to programming using Python, Y.Daniel Liang, Pearson ISBN-9780132747189		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: II**
Course Code	ECP120
Course Title	Fault Finding and Circuit Testing Lab
Credits	1.5
Contact Hours (L-T-P)	0-0-3
Course Status	Compulsory
Course Objective	The objective of this introductory course is to make students familiar with fault findingand circuit testing in electronic ciruits
Course Outcomes	After successful completion of this course the student will be able to: CO1: Identify the fundamental features passive and active components.CO2: Applying continuity of components with multimeter CO3: Applying continuity of components with CRO. CO4: Applying testing methods on circuits without power supply.CO5: Applying testing methods of circuits with power supply. CO6: Demonstration of ability of fault finding of circuits.
Course Description	This course will make students familiar with fault finding and circuit testing inelectronic ciruits using multimeter and CROs

Outline syllabus			
List of Experiments			
Experiment 1	Introduction to possible faults in passive components		
Experiment 2	Introduction to possible faults in active components		
Experiment 3	Hands on with fault finding instruments(Multimeter)		
Experiment 4	Hands on with fault finding instruments(CRO)		
Experiment 5	Testing of resistors (Lumped and distributed)		
Experiment 6	Testing of capacitors and inductors.(Transformers)		
Experiment 7	Testing of electronic circuits (amplifier circuits, power supply such as small circuits) without supply		
Experiment 8	Testing of electronic circuits (amplifier circuits, power supplysuch as small circuits) with supply		
Experiment 9	Testing of Electrical circuits (mother board like complex circuits)		
Experiment 10	Testing of Electrical circuits such as dc and ac motors		
Mode of examination	Practical		
Weightage Distribution	CA	CE(Viva)	ETE
	25%	25%	50%
Text book/s*	Manual		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: II**
Course Code	ECP240
Course Title	**Digital System Design Lab**
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
Course Objective	1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits. 2. To prepare students to perform the analysis and design of various digital electronic circuits. 3.To be able to model and simulate digital circuits in verilog and VHDL
Course Outcomes	After successful completion of this course the student will be able to: CO1: the structure of various number systemsand its application in digital design. CO2: Analyze and design various combinational,sequential circuits and logic familie CO3: Model circuits and systems in System Verilog or VHDL CO4: Describe sequential digital systems in a hardware description language. CO5: Apply HDL for the functional verification of FSM. CO6: Analyze a given combinational circuit
Course Description	The course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, multiplexer, demultiplexer, programmable logic circuits and other related topics. Upon completion, students should be able to construct, analyze, verify, and troubleshoot digital circuits using appropriate techniques and test equipment as well as can model and simulate using verilog and vhdl.

Outline syllabus

Unit 1	
A	To verify and design AND, OR, NOT and XOR gates using NAND gates.
B	To verify and design AND, OR, NOT and XOR gates using NOR gates.
C	To convert a Boolean expression into logic gate circuit and assemble it using logic gate IC's
Unit 2	
A	Design a Half and Full Adder.
B	Design a Half and Full Subtractor.
C	Design a seven-segment display driver.

Unit 3			
A	To build a Flip- Flop Circuits using elementary gates. (RS, Clocked RS, D-type).		
B	Design a counter using D/T/JK Flip-Flop.		
C	Design a 4 X 1 Multiplexer using gates.		
Unit 4			
A	To study basic Logic Families.		
B	Half adder, Full Adder using basic and derived gates.		
C	Half subtractor and Full Subtractor using basic and derived Gates		
Unit 5			
A	Write code to realize basic and derived logic gates.		
B	Clocked D FF, T FF and JK FF (with Reset inputs). Multiplexer (4x1, 8x1) and Demultiplexer using logic gates.		
C	Code converters (Binary to Gray and vice versa). 2 bit Magnitude comparator. 3 bit Ripple counter.		
Mode of examination	Practical/Viva		
Weightage Distribution	CA	CE	ETE
	25%	25%	50%
Text book/s*	Lab Manual		
Other References			

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ALL	**Semester: II**
Course Code	**ARP102**
Course Title	Communicative English -2
Credits	2
Contact Hours (L-T-P)	1-0-2
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, longand short essays.
Course Outcomes	After completion of this course, students will be able to: CO1 Acquire Vision, Goals and Strategies through Audio- visual Language Texts CO2 Synthesize complex concepts and present them in creative writing. CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice CO4 Determine their role in achieving team success through defining strategies for effective communication with different people. CO5 Realize their potentials as human beings and conduct themselves properly in the ways of world. CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning
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.

Outline syllabus

Unit 1	**Acquiring Vision, Goals and Strategies through Audio-visual Language Texts**
A	Pursuit of Happiness / Goal Setting & Value Proposition in life
B	12 Angry Men / Ethics & Principles
C	The King's Speech / Mission statement in life | strategies & Action Plans in Life
Unit 2	**Creative Writing**
A	Story Reconstruction - Positive Thinking
B	Theme based Story Writing - Positive attitude
C	Learning Diary Learning Log – Self-introspection

Unit 3	**Writing Skills 1**
A	Precis
B	Paraphrasing
C	Essays (Simple essays)
Unit 4	**MTI Reduction/Neutral Accent through Classroom Sessions & Practice**
A	Vowel, Consonant, sound correction, speech sounds, Monothongs, Dipthongs and Tripthongs
B	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds
C	Speech Sounds | Speech Music| Tone | Volume| Diction |Syntax |Intonation | Syllable Stress |
Unit 5	**Gauging MTI Reduction Effectiveness through Free Speech**
A	Jam sessions
B	Extempore
C	Situation-based Role Play
Unit 6	**Leadership and Management Skills**
A	Innovative Leadership and Design Thinking
B	Ethics and Integrity
Unit 7	**Universal Human Values**
A	Love & Compassion, Non-Violence & Truth
B	Righteousness, Peace
C	Service, Renunciation (Sacrifice)
Unit 8	**Introduction to Quantitative aptitude & Logical Reasoning**
A	Analytical Reasoning & Puzzle Solving
B	Number Systems and its Application in Solving Problems
C	Case Study

Evaluations	**CA**	**CE**	**ETE**
	25	25	50

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

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ALL		**Semester: II**
1	Course No.	HMM111
2	Course Title	Human Value and Ethics
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
5	Course Objective	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence
6	Course Outcomes	**On a successful completion of this course students will be able to** 1. Understand that the technical education without study of human values can generate more problems than solutions. 2. Define the principles and ideals, which help in making the judgement of what is more important. 3. See that 'I' and 'Body' are two realities, and most of their desires are related to 'I' and not body, while their efforts are mostly centered on the fulfilment of the needs of the body assuming that it will meet the needs of 'I' too. 4. Appreciate the importance of harmony in the self, family and the society for mutual fulfilment. 5. Understand the importance of harmony among human beings, other living beings and entire nature for universal equilibrium and mutual co-existence. 6. Know and practice the ethical approach in profession for continuous happiness and sustained prosperity.
7	Outline of syllabus:	
7.01	**Unit A**	**The Need and Process for Value Education**
7.02	Unit A Topic 1	The need, basic guidelines, content and process for Value Education
7.03	Unit A Topic 2	Concept of 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration; Continuous Happiness and Prosperity- A look at basic Human Aspirations
7.04	Unit A Topic 3	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority
7.05	**Unit B**	**Understanding Harmony in the Human Being - Harmony in Myself**
7.06	Unit B Topic 1	Human being as a co-existence of the sentient 'I' and the material 'Body'
7.07	Unit B Topic 2	The needs of Self ('I') and 'Body' ; Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

7.08	Unit B Topic 3	The characteristics and activities of 'I' and harmony in 'I' ; Understanding the harmony of I with the Body: Correct appraisal of Physical needs, meaning of Prosperity in detail
7.09	**Unit C**	**Harmony in the Family and Society**
7.10	Unit C Topic 1	Values in human-human relationship; Trust and Respect as the foundational values of relationship
7.11	Unit C Topic 2	Understanding the meaning of Trust; Difference between intention and competence; The meaning of Respect; Difference between respect and differentiation; the other salient values in relationship
7.12	Unit C Topic 3	Harmony in the society (society being an extension of family; Visualizing a universal harmonious order in society - from family to world family
7.13	**Unit D**	**Harmony in the Nature and Existence**
7.14	Unit D Topic 1	The harmony in the Nature
7.15	Unit D Topic 2	Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature
7.16	Unit D Topic 3	Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
7.17	**Unit E**	**Competence in professional ethics**
7.18	Unit E Topic 1	Ability to utilize the professional competence for augmenting universal human order
7.19	Unit E Topic 2	Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
7.20	Unit E Topic 3	Ability to identify and develop appropriate technologies and management patterns for above production systems.
8	Course Evaluation	
8.1	Course work: 25 marks	
8.11	Attendance	None
8.12	Homework	4 assignments, no weight
8.13	Quizzes/Class Tests	Two
8.14	Projects	None
8.15	Presentations	None
8.16	Any other	None
8.2	MTE	one, 25 marks
8.3	End-term examination: 50 marks	
9.1	Text books	1. R.R Gaur, R Sangal, G P Bagaria, "A foundation course in Human Values and professional Ethics", Excel books, New Delhi
9.2	Other references	1. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. 2. A.N. Tripathy, 2003, Human Values, New Age International Publishers. 3. PL Dhar, RR Gaur, Science and Humanism, Commonwealth Publishers.

TERM-III

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: III**
Course Code	**MTH 145**
Course Title	**Probability and Statistics**
Credits	4
Contact Hours (L-T-P)	3-1-0
Course Status	Compulsory
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.
Course Outcomes	CO1: Explain the concept of probability and Random Variable. CO2: Explain the concept of distribution functions, densities and probability distributions; illustrate discrete and continuous probability distributions. CO3: Describe the concept of moments, skewness and Kurtosis; evaluate correlation and regression – Rank correlation; discuss bivariate distributions and their properties CO4: Discuss the basic of Curve fitting by the method of least squares; evaluate straight lines, second degree parabolas and more general curves. 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. 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.
Course Description	This course is an introduction to the fundamental of Mathematics. The primary objective of the course is to develop the basic understandingof 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.

Outline syllabus :Probability and Statistics

Unit 1	**Basic Probability**
A	Probability spaces, conditional probability, Bayes' rule.
B	Discrete random variables, Independent Random variables

C	Expectation of Discrete Random Variables, Chebyshev's Inequality		
Unit 2	**Discrete and Continuous Probability Distributions**		
A	Discrete Probability distributions: Binomial, Poisson.		
B	Continuous random variables and their properties, distribution functions and densities.		
C	Normal, exponential and gamma distribution.		
Unit 3	**Statistics**		
A	Moments, skewness and Kurtosis.		
B	Correlation and regression – Rank correlation.		
C	Bivariate distributions and their properties.		
Unit 4	**Applied Statistics**		
A	Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.		
B	Test of significance: Large sample test for single proportion,		
C	Difference of proportions, single mean, difference of means, and difference of standard deviations.		
Unit 5	**Testing Hypothesis**		
A	Test for single mean, difference of means		
B	test for ratio of variances		
C	Chi-square test for goodness of fit and independence of Attributes		
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	25%	25%	50%
Text book/s*	1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2011- ISBN: 9780470458365. 2. S. Ross, A First Course in Probability, 10th Ed., Pearson Education India, 2018- ISBN: 9780134753119.		
Other References	1. W. Feller, An Introduction to Probability Theory and its Applications,Vol. 1, 6th Ed., Wiley, 2003- ISBN: 9788126518050. 2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35thEdition, 2000. Veerarajan T.,Engineering Mathematics (for semester III), Tata McGraw-Hill, New Delhi,- ISBN:9788174091956 2013.		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: III**
Course Code	**ECE237**
Course Title	**Analog Circuits-I**
Credits	3
Contact Hours (L-T-P)	3-0-0
Course Status	Compulsory
Course Objective	1. To develop a knowledge of special diodes. 2. To develop a knowledge of BJT and MOSFET devices. 3. Which can be used in the design and analysis of various useful circuits. 4. To study differential, multi-stage and operational amplifiers.
Course Outcomes	The students will be able to: CO1: Explain the various diodes as high speed switch for RF applications. CO2: Illustrate the functioning of BJT and design different circuits. CO3: Interpret the functioning of J-FET and design different circuits. CO4: Explain the functioning of MOS-FET and operating indifferent modes. CO5: Illustrate knowledge of amplifiers using BJT and FET. CO6: Design and analysis of differential, multi-stage and operational amplifier circuitsusing BJT and MOSFET
Course Description	After completing this course students will be able to design the different types of circuits with the help of E-CAD tools and compare the measuredand simulated results.
Outline syllabus	
Unit 1	**Types of Diodes (Special Diodes)**
A	Zener diode: Equivalent circuit of Zener diode and V- I characteristics. Principle of operation of Zener diode as voltage regulator.
B	Light Emitting Diodes (LEDs): p-n Junction and general structure of LED. Emission of light, characteristics and its applications.
C	Varactor (Vari-cap) diodes: characteristics, and its applications. Schottky diodes: Structure of metal- semiconductor junction, characteristics.

	applications. Schottky diodes: Structure of metal- semiconductor junction, characteristics.		
Unit 2	**Bipolar Junction Transistor (BJT)**		
A	Basics introduction of BJT, Modes of operation, Structure ofactual transistor, Ebers-Moll (EM) Model.		
B	Circuit symbol and conventions for n-p-n and p-n-p transistor. The Early Effect, input and output characteristics of BJT in CB, CE, and CC.		
C	BJT as an amplifier and switch, BJT circuit at DC, Different types of biasing in BJT amplifier circuit. Small- signal operation and Hybrid-π model.		
Unit 3	**Junction Field Effect Transistors (J-FET)**		
A	Junction Field Effect Transistor: Basic ideas – Field effect, Reverse bias of gate voltage, Gate voltage controls draincurrent, Schematic symbol		
B	Construction and characteristic of JFETs (n-channel and p-channel), Voltage controlled resister, Transfer characteristics		
C	J-FET Biasing Configuration: Fixed bias, Self bias,and Voltage- divider biasing.		
Unit 4	**Metal Oxide Semiconductor Field Effect Transistors (MOS-FET)**		
A	Metal Oxide Semiconductor (MOS) Structure, TheMOS system under external bias, Operation of MOS transistor, Formation of channel, Enhancement and Depletion MOSFET.		
B	MOSFET current-voltage (I_D-V_{DS}) characteristics forn- MOSand p-MOS. Drain current (I_D) equation in linear and saturation mode.		
C	Application of MOSFET as an amplifier and switch.		
Unit 5	**Differential, multi-stage and operationalamplifiers**		
A	Differential amplifier, power amplifier, direct coupled multi-stage amplifier.		
B	Internal structure of an operational amplifier, ideal op-amp.		
C	Non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)		
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	25%	25%	50%

Text book/s*	1. Robert L. Boylestad, “Electronic Devices andCircuit Theory”, PHI - ISBN: 9780131189058 2. S. Sedra and K. C. Smith, “MicroelectronicCircuits”, Oxford University Press- ISBN:9780190853464 3. Sung-Mo Kang, “CMOS Digital Integrated Circuits”, TMH- ISBN: 9780071326346	
Other References	1. J. Millman, C. C. Halkias, “Electronics Devicesand Circuits”, McGraw-Hill- ISBN:9780071337069 2. S. Salivahanan, N. Suresh Kumar, “Electronics Devices and Circuits”,2003- ISBN: 9780070534766	

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**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: **Select** appropriate data structures as applied to specified problem definition. CO2: **Choose** the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently. CO3 **Represent** and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications. CO4: **Compare** various techniques for searching and sorting. CO5: **Design** and implement an appropriate hashing function for an application CO6: **Formulate** new solutions for programing problems or improve existing code using learned algorithms and data structures
7	Course Description	This course starts with an introduction to data structures with its classification, efficiency of different algorithms, array and pointer based implementations and Recursive applications. As the course progresses the study of Linear and Non-Linear data structures are studied in details. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.
8	Outline syllabus	
	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.
	B	Dynamic Memory Allocation(Malloc, calloc, realloc, free), Recursion – Definition, Examples- Tower of Hanoi problem, Tail Recursion
	C	Arrays: Implementation of One Dimensional Arrays, Multidimensional Arrays, Applications of Arrays, Address Calculation, Matrix Operations, Sparse martices
	Unit 2	**Linked List**
	A	Concept of Linked List, Garbage Collection, Overflow and Underflow, Array Implementation and Dynamic Implementation of Singly Linked Lists
	B	Array Implementation and Dynamic Implementation of Doubly Linked List, Circularly Linked List

		Polynomial Representation and Addition		
	Unit 3	Stack and Queue		
	A	Stacks: Definitions, Primitive operations, Application of stacks – Conversion of Infix Expression to Postfix form, Evaluation of Postfix Expressions		
	B	Queues: Definition, Primitive Operations, Implementation of Circular Queues, Priority Queues		
	C	Deques, Application of Queues. Implementation - Linked Stacks, Linked Queues.		
	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		
	B	Graph: Terminology, Representation, Traversals- Depth First Search, Breadth First Search.		
	C	Graph Applications – Minimum Spanning Trees – Prim's and Kruskal's Algorithms		
	Unit 5	**Searching, Sorting and Hashing**		
	A	Implementation and Analysis - Linear search, Binary Search		
	B	Implementation and Analysis- Bubble Sort, Insertion Sort, Selection Sort, Tree sort		
	C	Hashing: Concepts and Applications, Hash Functions, Collisions, Methods of Resolving Collisions		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	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 Programme Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: III**
1	Course Code	CSE253
2	Course Title	Object Oriented Programming Using Java
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Core
5	Course Objective	To learn Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism and multithreading.
6	Course Outcomes	CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem. CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance. CO4: Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling. CO5. Explain the concept of multithreading. CO6. Design real life application using Java
7	Course Description	Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed.
8	Outline syllabus	
	Unit 1	**Introduction to Object Oriented Paradigm**
	A	Introduction to OOP, Characteristics of OOP, Difference between OOP and procedural languages
	B	Byte Code, Architecture of JVM
	C	Features of Java, Class Loader Execution Engine, Garbage collection.
	Unit 2	**Introduction to Java**
	A	Classes, Objects ,Constructors, Methods
	B	Constants, Variables, Data Types, Operators, Expressions, Decision Making Branching, Loops
	C	Arrays
	Unit 3	**Polymorphism & String handling**
	A	Polymorphism, method overloading
	B	Constructors overloading , Wrapper class ,Type conversion & casting,
	C	Strings and String handling,
	Unit 4	**Inheritance**
	A	Inheritance, Types of inheritance, Overriding methods, use of this

		and super		
	B	Constructor call in inheritance, Abstract class , Concept of multiple inheritance in Java		
	C	Final class, method and variable, Interface, Access Modifiers		
	Unit 5	**Exception and Multithreading**		
	A	Introduction to Exception Handling, Introduction to try, catch, Finally , throw and throws		
	B	Checked and Unchecked exceptions, User define exception		
	C	Introduction to Multithreading, Creatingthread using Runnable interface and Thread class, Thread life cycle		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	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		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: III**
Course Code	ECE098
Course Title	SENSORS AND TRANSDUCERS
Credits	3
Contact Hours (L-T-P)	3-0-0
Course Status	Compulsory
Course Objective	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
Course Outcomes	The students will be able to: CO1: Intrepert the principle of various Transducers, CO2: Explain the construction of Transducers, CO3: Apply the analog signal conditioning for measurements. CO4: Apply the digital signal conditioning for measurements. applications and principles of operation, standards and units of measurements. CO 5 : D evelop basic skills in the design of electronic equipment. CO6: Explain various measurements techniques for industrial applications based on transducers.
Course Description	This course deals with sensors and transducers. The different measuring techniques will also be discussed.

Outline syllabus

Unit 1	**Introduction to Electronics Measurement and Instrumentation**
A	Transducers and sensors- Accuracy and precisions multiplication.
B	types of errors, statistical analysis, probability of errors, limiting errors.
C	sensitivity, linearity, hysteresis, resolution, reproducibility, transfer function.
Unit 2	**Analog Signal Conditioning**
A	Signal conditioning, Loading effects, Bridges for measurement techniques, Wheatstone, Wein, Kelvin's, Maxwell bridge and Hey bridge,
B	Attenuators and Amplifiers, Passive filters, Op-amp based signal conditioning circuits,
C	Inverting and Non-Inverting Amplifiers, Linearization, Differential amplifiers and Instrumentation amplifiers.
Unit 3	

A	Digital measuring techniques, Sample and Hold Circuits, Comparator, Buffers, D/A Conversion and A/D Conversion		
B	Weighted Resistor DAC, R-2R ladder DAC, Dual Slope, Parallel-comparator.		
C	Successive Approximation ADC techniques, Single channel and multi-channel Data Acquisition System (DAS).		
Unit 4	**Temperature Sensors**		
A	Resistance Vs Temperature characteristics for different materials.		
B	Thermistors, Thermocouples - thermoelectric effects for Thermocouples		
C	thermocouple tables, RTD, Other Thermal Sensors.		
Unit 5	**Pressure, force, displacement, and weight measurement:**		
A	Capacitive and inductive transducers, Displacement Sensor (LVDT)		
B	Strain Sensors – strain gauges, its principle, applications gauges, Load cells, Piezo-electric sensors, Motion sensors.		
C	Basic principle of flow meter, Differential pressure flow meters, Variable area flow meter, Volumetric flow meter, Hotwire anemometer, Magnetic and ultrasonic flow meter, Rota meter, Hall effect transducer working and measurement techniques		
Mode of examination	Theory		
Weightage Distribution	CA	MTE	ETE
	25%	25%	50%
Text book/s*	1. Curtis D. Johnson, "Process Control Instrumentation Technology", Prentice Hall India. 2. D.V.S. Murty, "Transducers and Instrumentation", Prentice Hall India. 3. Helfrick Albert D. and Cooper W. D., "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall India.		
Other References	1. Kalsi H. S. "Electronic Instrumentation", Tata McGraw-Hill Education. 2. Shawhney A. K. "A Course In Electrical and Electronics Measurements and Instrumentation", DhanpatRai& Sons, 11th Ed., 1999. 3. Bell David A. "Electronic Instrumentation and Measurements", PHI / Pearson Education		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: III**
Course Code	**ARP207**
Course Title	**Logical Skills Building and Soft Skills**
Credits	2
Contact Hours (L-T-P)	0-0-4
Course Status	Compulsory
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.
Course Outcomes	After completion of this course, students will be able to: CO1: Ascertain a competency level through Building Essential Language and Life Skills CO2: Build positive emotional competence in self and learn GOAL Setting and SMART Goals techniques CO3: Apply positive thinking, goal setting and success-focused attitudes which would help them in their academic as well as professional career CO4: Acquire satisfactory competency in use of aptitude, logical and analytical reasoning CO5: Develop strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate an ability to apply various quantitative aptitude tools for making business decisions
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.
Outline syllabus – ARP 207	
Unit 1	**BELLS (Building Essential Language and Life Skills)**
A	Know Yourself: Core Competence. A very unique and interactive approach through an engaging questionnaire to ascertain a student's current skill level to design, architect and expose a student to the right syllabus as also to identify the correct TNI/TNA levels of the student.

B	Techniques of Self Awareness | Self Esteem & Effectiveness| Building Positive Attitude | Building Emotional Competence		
C	Positive Thinking & Attitude Building | Goal Setting and SMART Goals – Milestone Mapping | Enhancing L S R W G and P (Listening Speaking Reading Writing Grammar and Pronunciation) | Verbal Abilities – 1		
Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**		
A	Syllogism | Letter Series | Coding, Decoding , Ranking & Their Comparison Level-1		
B	Number Puzzles		
C	Selection Based On Given Conditions		
Unit 3	**Quantitative Aptitude**		
A	Number Systems Level 1 | Vedic Maths Level-1		
B	Percentage ,Ratio & Proportion		
C	| Mensuration - Area & Volume |Algebra		
Weightage Distribution	CA	CE	ETE
	25%	25%	50%
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		

School: SSET		Batch: 2023-2027
Programme:		**B.Tech.**
Branch: ENC		**Semester: III**
1	Course Code	ECP098
2	Course Title	Sensors and Transducers Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
6	Course Outcomes	After successful completion of this course the student will be able to: CO1: Ability to calculate errors, accuracy, and precision. CO2: Understand the terminology of Instrumentation and analyze various sensors. CO3: Able to apply signal conditioning for measurements. CO4: Apply temperature measurement using temperature sensors. CO5: Explain various measurements techniques for industrial applications based on transducers. CO6: Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers and develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system. .
7	Course Description	This introductory course is offered to students to make them proficient in design, layout, product development, and other careers that require technical drawing. Using the current version of the AutoCAD software, students will learn a variety of drawingtechniques and be able to replicate specific drawings in multiple perspectives. The pinnacle of the class is to empower and enable students to create using the software provided. Career opportunities and 3-D modelling, manufacturing, and engineering will also be explored. No drafting or computer experience is necessary.
8	Outline syllabus	
	List of Experiments	
	Experiment 1	Designing DC bridge for Resistance Measurement (Quarter, Half and Full bridge)

	Experiment 2	Designing AC bridge Circuit for capacitance measurement		
	Experiment 3	Designing signal Conditioning circuit for Pressure Measurement		
	Experiment 4	Designing signal Conditioning circuit for Temperature Measurement		
	Experiment 5	Designing signal Conditioning circuit for Torque Measurement		
	Experiment 6	Designing signal Conditioning circuit for Strain Measurement.		
	Experiment 7	Experimental study for the characteristics of ADC and DAC		
	Experiment 8	Error compensation study using Numerical analysis using MATLAB (regression).		
	Mode of examination	Practical/viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: III**
1	Course Code	**ECP251**
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 realisticproblem 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 oftechnology for project development CO2: Identify, analyze, formulate and handle programmingprojects with a comprehensive and systematic approach CO3: Discuss and accumulate the background information CO4: Develop effective communication skills forpresentation of project related activities CO5: Contribute as an individual or in a team indevelopment of technical projects CO6: Demonstrate effectively the module designed
7	Course Description	In PBL-1, the students will learn how to define the problemfor 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	
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.
	Unit 2	Develop a work flow or block diagram for the proposed system / software.
	Unit 3	Design Flow Chart for the proposed problem.
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.
	Unit 5	Demonstrate and execute Project with the team. Test the project modules.

		References if any. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.		
	Mode of examination	Practical/Viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	Relevant books		
	Other References	Relevant publications		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**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 basic concepts of Data Structures and algorithms. 2. Design and Implementation of Various Basic and Advanced Data Structures. 3. Learn the concepts of various searching, Sorting and Hashing Techniques. 4. Choose the appropriate data structures and algorithm design method for a specified application.
6	Course Outcomes	CO1: **Implement** operation like traversing, insertion, deletion, searching etc. on various data structures. CO2: **Apply** linear data structure(s) to solve various problems CO3: **Develop** the solution of any problem using non linear data structure(s) CO4: **Create** a solution of any problem using searching and sorting techniques CO5: **Design** a hash function using any programming language CO6:**Choose** the most appropriate data structure(s) for a given problem
7	Course Description	This course starts with an introduction to data structures with its classification, efficiency of different algorithms, array and pointer based implementations and Recursive applications. As the course progresses the study of Linear and Non-Linear data structures are studied in details. The course talks primarily about Linked list, stacks, queue, Tree structure, Graphs etc. This Course also deals with the concept of searching, sorting and hashing methods.
8	Outline syllabus	
	Unit 1	**Introduction**
		Programme to implement Operation on Array such as Traversing, Insertion & Deletion operation
		Programme based on Recursion such as Towers of Hanoi, Fibonacci series etc.
	Unit 2	**Linked List**
		Programme to implement different operation on the following linked list: Singly, Doubly and circular linked list.
	Unit 3	**Stack & Queue**
		Programme to Implement Stack operation using Array and Linked list
		Programme to convert infix expression to post fix expression

		Programme on Evaluation of Post fix expression		
		Programme to implement queue operation using array and linked list		
		Programme to implement circular queue and deque.		
	Unit 4	**Tree & Graph**		
		Programme to implement binary tree and BST.		
		Programme to implement MST and shortest path algorithm.		
	Unit 5	**Searching, Sorting & Hashing**		
		Programme on Searching and Hashing		
		Programme on Sorting.		
	Mode of examination	Practical		
	Weightage Distribution	CA	CE	ETE
		25%	25%	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 Programme Design in C", Pearson Education 5. G A V Pai, "Data Structures and Algorithms", TMH		

C

School: SSET		**Batch: 2023-2027**		
Programme:		**B.Tech.**		
Branch: ENC		**Semester: III**		
1	Course Code	CSP243		
2	Course Title	Object Oriented Programming Using Java Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Compulsory/Elective		
5	Course Objective	To learn Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism, packages and multithreading.		
6	Course Outcomes	CO1. Define Object oriented programming concepts by identifying classes, objects, members of a class and relationships among them needed for a specific problem. CO2: Illustrate different features of java. CO3: Develop Java programs to solve problems of applications using OOP principles such as abstraction, polymorphism and inheritance. CO4:Categorize runtime errors thrown in the application software or generated runtime by applying the methods of exception handling and File I/O CO5. Explain the concept of multithreading. CO6. Design real life application using Java		
7	Course Description	Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed.		
8	Outline syllabus			
	Unit 1	**Introduction to Object Oriented Paradigm**		
		Programme related to garbage collection and OOPS		
	Unit 2	**Introduction to Java**		
		Programme to take input from user, decision making and branching		
	Unit 3	**Polymorphism**		
		Programme related to string handling and polymorphism		
	Unit 4	**Inheritance, package and Interface Inheritance Implementation**		
		Programme related to inheritance and interfaces		
	Unit 5	**Exception and Multithreading**		
		Programme related to exception handling		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	1.Schildt H, "The Complete Reference JAVA2", TMH		
	Other References	3. Balagurusamy E, "Programming in JAVA", TMH Professional Java Programming: BrettSpell, WROX Publication		

TERM-IV

School: SSET		**Batch : 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV**
1	Course Code	CSE251
2	Course Title	Theory of Computation
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
5	Course Objective	The goal of this course is to provide students with an understanding of basic concepts in the theory of computation.
6	Course Outcomes	Students will be able to: **CO1:Formulate** the concept of Automata and related terminology. **CO2:Design** DFA and NDFA and conversion from NDFA to DFA. **CO3:Construct** finite automata without output and with output. **CO4:Implement** regular expression and grammar corresponding to DFA and vice-versa **CO5:Design** Push down Automata from Context Free Language or Grammar and vice-versa. **CO6:Design** Turing Machine for computational problems, Develop a clear understanding of un-decidability.
7	Course Description	The course introduces some fundamental concepts in automata theory and formal languages including grammar, finite automaton, regular expression, formal language, pushdown automaton, and Turing machine. Not only do they form basic models of computation, they are also the foundation of many branches of computer science, e.g. compilers, software engineering, concurrent systems, etc. The properties of these models will be studied and various rigorous techniques for analyzing and comparing them will be discussed, by using both formalism and examples.
8	Outline syllabus	
	Unit 1	**Finite Automata**
	A	Introduction to languages, Kleene closures, Finite Automata (FA), Transition graph, Nondeterministic finite Automata (NFA), Deterministic finite Automata (DFA).
	B	Equivalence of NDFA and DFA, Construction of DFA from NFA and optimization of Finite Automata.
	C	Applications and Limitation of FA. (FAT tool).
	Unit 2	**Regular Expression and Finite Automata**
	A	Regular Expression, Finite Automata with null move, Regular Expression to Finite Automata.
	B	Arden Theorem, Pumping Lemma for regular expressions.
	C	FA with output: Moore machine, Mealy machine and Equivalence.
	Unit 3	**REGULAR & CONTEXT FREE LANGUAGE**
	A	Defining grammar, Chomsky hierarchy of Languages and Grammar. Ambiguous to Unambiguous CFG.
	B	Simplification of CFGs.
	C	Normal forms for CFGs, Pumping lemma for CFLs.
	Unit 4	**PUSH DOWN AUTOMATA**

	A	Description and definition of PDA and Non-Deterministic PDA, Working of PDA.		
	B	Acceptance of a string by PDA with final state and with Null store. Two stack PDA.		
	C	Conversion of PDA into CFG, Conversion of CFG into PDA.		
	Unit 5	**TURING MACHINE**		
	A	Turing machines (TM): Basic model, definition and representation, Language acceptance by TM.		
	B	Turing machine as a computational machine, Halting problem of TM, Universal TM (Visual Turing machine).		
	C	Modifications in TM, Undecidability of Post correspondence problem, Church's Thesis, Godel Numbering.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	1. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science(Automata, Languages and Computation)", PHI		
	Other References	1. Peter Linz, "Formal Languages and Auomata", Narosa Publishing House 2. Hopcroft, Ullman, "Introduction to Automata Theory, Language and Computation", Narosa Publishing House		

School: SSET	**Batch : 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: IV**
Course Code	ECE243
Course Title	Analog Circuits-II
Credits	4
Contact Hours (L-T-P)	3-1-0
Course Status	Compulsory
Course Objective	To explain the basic concept of feedback and types of feedback. To explain the operational amplifier and their applications. To acquire knowledge about filters and oscillators. To acquire knowledge about multivibrators. To explain analog to digital converter(ADC),digital to analog converter(DAC),integrated circuit timer and phased looked loop(PLL)..
Course Outcomes	After successful completion of this course the student will be able to: CO1: Define and explain basics of feedback amplifier CO2: Demonstrate the concepts of op-amp and analyze its characteristics CO3: Analyse and design linear applications of op-amp CO4: Analyse and compare nonlinear applications of op-amp and study of D/A,A/D PLL,555 timer CO5: Analyse the advance circuits like converters and multivibrators. CO6: Analyse the functioning of OP-AMP and design OP-AMP based circuits.
Course Description	This is a course on the design and applications of operational amplifiers and analog integrated circuits. This course introduces basic op-amp principles and show how the op-amp can be used to solve a variety of application problems. Much attention is given to basic op-amp configurations, linear and non-linear applications of op- amp and active filter synthesis, including switched capacitor configurations. It h also deals with oscillators, waveform generators and data converters.
Unit 1	**Feedback Amplifier**
A	The general feedback structure, properties of negative Feedback
B	The four basic feedback topologies: the series-shunt feedback Amplifier
C	The series-series feedback amplifier, the shunt-shunt and shunt series feedback amplifier.
Unit 2	**Introduction of Operational Amplifiers**
A	Introduction, ideal Op-Amp, the Op-Amp terminals, Function and Characteristics of the ideal Op-Amp,the close loop gain.
B	Differential and Common-Mode Signals, Inverting and non- inverting configuration, the close loop gain, Input and output resistance and slew rate.
C	Weighted Summer, Voltage follower, Difference Amplifier, Integrator and Differentiator.

	Unit 3	**Opamp Applications**		
	A	An Overview of Op-Amp based circuits V-I and I-V converters.		
	B	Generalized impedance converter, simulation of inductors.		
	C	First and second order LP,HP,BP,BS and All pass active filters.		
	Unit 4	**Nonlinear Applications of Operational Amplifiers**		
	A	Log-Antilog Amplifiers, Instrumentation Amplifier, Isolation Amplifier.		
	B	Precision Rectifiers, Peak Detectors, Sample and HoldCircuits, Schmitt trigger, stable Multi-vibrator,Monostable Multi-vibrator, Generation of Triangular Waveforms.		
	C	Analog Multipliers and their applications, Op-Amp as a comparator, Zero Crossing detector.		
	Unit 5	**D/A and A/D Converters**		
	A	Basic circuits using Binary weighted Resistors, R-2R ladder D/A converters.		
	B	Dual Slop,Parallel,SAR A/D converters.		
	C	The 555 circuit, implementing a MonostableMultivibrator using 555 IC, AstableMultivibrator Using 555 IC, Ex-OR Gates and multipliers as phase detectors, Block Diagram of IC PLL (NE565).		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s *	1. Sedra and Smith, ‘‘Microelectronic Circuits’’, 5th Edition, Oxford University Press– ISBN: 9780195172683 2. Ramakant A. Gayakwad, “Op-Amp and Linear Integrated Circuits’’ Pearson Education, 6th Edition – ISBN: 9780131224568		
	Other References	1.SSalivahanan and VSK Bhaaskaran, ‘‘Linear Integrated Circuits’’, Tenth Reprint 2012, TMH Education Pvt. Ltd– ISBN:9780070648074		

School: SSET		**Batch : 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV**
1	Course Code	**ECP290**
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: Expalin 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: Illustrate and accumulate the background information CO4: Develop effective communication skills for presentation of project related activities CO5: Build as an individual or in a team indevelopment of technical projects CO6: Demonstrate effectively the module designed
7	Course Description	In PBL-2, the students will learn how to define the problemfor developing projects, identifying the skills required developing the project based on given a set of specifications and all subjects of that Semester.
8	Outline syllabus	
	Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.
	Unit 2	Develop a work flow or block diagram for the proposed system / software.
	Unit 3	Design Flow Chart for the proposed problem.
	Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.
	Unit 5	Demonstrate and execute Project with the team. Test the project modules.
		Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Implementation Detail & Test Reports.

		References if any. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.		
	Mode of examination	Practical/viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	Relevant Documents		
	Other References	Relevant Papers		

School: SSET		**Batch : 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV**
1	Course Code	ECP237
2	Course Title	**Analog Circuit Lab**
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	1. To develop a knowledge of special diodes. 2. To develop a knowledge of BJT and MOSFET devices. 3. It can be used in the design and analysis of various useful circuits. 4. To study differential, multi-stage and operational amplifiers.
6	Course Outcomes	After successful completion of this course the student will be able to: CO1: Apprehend the various diodes as high speed switch for RF applications. CO2: Explain the functioning of BJT and design different circuits. CO3: Apply the functioning of J-FET and design different circuits. CO4: Apply the functioning of MOS-FET and operating in differentmodes. CO5: Analyseefficiency of various Amplifiers. CO6: Design and analysis of differential, multi-stage and operational amplifier circuits usingBJT and MOSFET.
7	Course Description	To design the different type of circuits with the help of E-CAD tools and compare the experimental and simulation results.
8	Outline syllabus	

	Unit 1	**Practical based on Diodes**
	A	Plot the V-I characteristics of junction diode under forward and reverse biased condition, and find its Knee voltage.
	B	Plot the V-I characteristics of Zener diode and compare with p- n junction diode.
	C	To design Zener diode as a voltage regulator.
	Unit 2	**Practical related to BJT**
	A	To study the characteristics of BJT in CB configuration.
	B	To study the characteristics of BJT in CE configuration
	C	To design Zener diode as a wave shaping.
	Unit 3	**Practical related to FET**
	A	To plot the output characteristics of FET and measure pinch- off voltage.

	B	Examine the relationship between the drain current (I_D) And terminal voltages (V_{DS} & V_{GS}) of n-channel MOS transistor.		
	C	With the help circuits, define drain current (I_D) of the n- channel MOS transistor as a function of the gate-to-source voltage (V_{GS}), with $V_{DS} > V_{DSAT}$ (transistor in saturation)		
	Unit 5	**Practical related to Differential and operational amplifiers**		
	A	Design and analysis of differential amplifiers.		
	B	Design and characterization of operational amplifiers.		
	C	Design and characterization of filter using operational amplifier.		
	Mode of examination	Practical/Viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	1. Robert L. Boylestad, "Electronic Devices and Circuit Theory", PHI - ISBN: 9780131189058 2. S. Sedra and K. C. Smith, "Microelectronic Circuits", Oxford University Press-ISBN:9780190853464 3. Sung-Mo Kang, "CMOS Digital Integrated Circuits", TMH-ISBN: 9780071326346		
	Other References	1. J. Millman, C. C. Halkias, "Electronics Devices and Circuits", McGraw-Hill- ISBN:9780071337069 2. S. Salivahanan, N. Suresh Kumar, "Electronics Devices and Circuits",2003- ISBN: 9780070534766 3. Manuals		

School: SSET		Batch : 2023-2027
Programme:		B.Tech.
Branch: ENC		Semester: IV
1	Course Code	**ARP208**
2	Course Title	**Quantitative and Qualitative Aptitude Skill Building**
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Compulsory
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 2nd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	After completion of this course, students will be able to: CO1: Develop and deliver the effective presentations to interpret the deeper meaning of life. CO2: Improve listening skills so as to understand complex business communication in a variety of global English accents through proper pronunciation CO3: Demonstrate a good understanding of effective business writing and telephone handling Skills CO4: Acquire higher level competency in use of aptitude, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building number puzzles CO6: Demonstrate higher level quantitative aptitude tools for making business decisions
7	Course Description	This course bundle allows students to build vision, mission and strategy statements while exposing them to various models of communication along with MTI reduction and the 2nd level of quant, aptitude and reasoning abilities
8	Outline syllabus – ARP208	

	Unit 1	**Communicate to Conquer**		
	A	VMOSA (Vision, Mission, Values and Ethics)| Business Communication -Verbal Communication Skills | Barriers in communication | Basics of effective communication – PRIDE & STAR Model		
	B	Different styles of communication & style flexing (Based on the 4 social styles- Analytical, Driving, Expressive, Amiable) | Importance of Listening & practice of Active Listening | The Art of Giving Feedbacks| Feedback Skills | Asking fact finding questions- Probing Skills		
	C	Email Etiquette | Business Writing Skills| Telephone Etiquette Skills (Telephone Handling Skills) | Non Verbal Communication-Kinesthetics, Proxemics, Paralanguage | MTI Reduction Programme | Verbal Abilities - 2		
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**		
	A	Coding Decoding , Ranking & Their Comparison Level-2		
	B	Series, Blood Relations		
	C	Number Puzzle		
	Unit 3	**Quantitative Aptitude**		
	A	Number System Level 2		
	B	Vedic Maths Level-2 | Probability | Permutation & Combination		
	C	Percentage, Profit & Loss ,Partnership, Simple Interest & Compound Interest		
	Weightage Distribution	CA	CE	ESE
		25%	25%	50%
	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		

School: SSET		**Batch : 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV**
1	Course Code	CSE249
2	Course Title	**Database Management System**
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	
5	Course Objective	1. Develop the ability to design, 2. Implement and manipulate databases. 3. Introduce students to build data base management systems. 4. Apply DBMS concepts to various examples and real life applications.
6	Course Outcomes	Students will be able to: **CO1:** Explain the basics concepts of data base. **CO2:** Demonstrate the knowledge of databases to E-R modelling. **CO3:** Ability to design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respective data. **CO4:** Apply normalization techniques to reduce redundancy from the database. **CO5:** To appraise the basic issues of Transaction processing, Serializability& concurrency control **CO6:** Design & develop database for real life problems
7	Course Description	This course introduces database design and creation using a DBMS product. Emphasis is on, normalization, data integrity, data modeling, and creation of simple tables, queries, reports, and forms. Upon completion, students should be able to design and implement normalized database structures by creating simple database tables, queries, reports, and forms.
8	Outline syllabus	
	Unit 1	**Introduction to Databases:**
	A	Introduction of DBMS, Characteristic of DBMS, Data Models, Database languages, Database Administrator, Database Users.

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

	C	Granularity of Data Items and Multiple Granularity Locking		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	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.		

School: SSET		**Batch : 2023-2027**		
Programme:		**B.Tech.**		
Branch: ENC		**Semester: IV**		
1	Course Code	CSP249		
2	Course Title	Database Management System Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Compulsory		
5	Course Objective	To Develop efficient SQL programs to access Oracle databases Build database using Data Definition Language Statements Perform operations using Data Manipulation Language statements like Insert, Update and Delete		
6	Course Outcomes	By the end of this course you will be able to: CO1: Understand the concept of SQL commands in DBMS CO2: Create SQL SELECT statements that retrieve any required data CO3: Perform operations using Data Manipulation Language statements like Insert, Update and Delete CO4: Manipulate your data to modify and summaries your results for reporting CO5: Apply Grouping Clauses on various tuples & relations of database CO6: Develop project based on various SQL commands.		
7	Course Description	An introduction to the design and creation of relational databases. Create database-level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands-on experience.		
8	Outline syllabus			
	Unit 1	**Practical based Data types**		
		Classification SQL, Data types of SQL/Oracle		
	Unit 2	**Practical based on DDL commands**		
		Create table, Alter table and drop table		
	Unit 3	**DML commands and Aggregate functions**		
		Introduction about the INSERT, SELECT, UPDATE & DELETE commands.		
	Unit 4	**Practical based on Grouping Clauses GROUP BY ORDER BY & GROUP BY HAVING**		
		Briefly explain Group by, order by ,having clauses with examples. Aggregate function: sum, avg, count, max, min		
	Unit 5	**Practical based on Sub- queries, JOINS**		
		Related example of Sub- queries, Joins and related examples,Views,Trigger		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	CE(Viva)	ETE
		25%	25%	50%

	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. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.

TERM-V

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: V**
1	Course Code	CSE355
2	Course Title	Software Engineering and Testing Methodologies
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Core
5	Course Objective	The objective of this course is to provide 1. Fundamental knowledge of software engineering 2. To make student aware of best software engineering practices 3. Inculcate ability in students to work as an effective member or leader of software engineering teams 4. To help students to develop skills that will enable them to construct software of high quality
6	Course Outcomes	CO1: Illustrate and compare an effective software engineering process, based on knowledge of widely used development lifecycle model CO2: Apply effective requirement elicitation techniques to develop SRS for a project. CO3: Construct design documents with the help of designing tools CO4: Analyze testing strategies for a software system CO5: Develop and deliver quality software as an individual or as part of a multidisciplinary team. CO6: Adapt techniques and tools necessary for software engineering practices.
7	Course Description	This course provides knowledge of software engineering. It introduces concepts such as software processes and agile methods and essential software development activities, from initial specification to system maintenance. Formalisms and tools to assist in software development are also presented, including common design patterns and UML notation. Course focuses on all levels of testing.
8	Outline syllabus	
	Unit 1	**Introduction to Software Engineering and Process Models**
	A	Significance challenges and Software Myths in software engineering, Software Components, Software Characteristics, Software Crisis, software applications
	B	Software Development Methodologies: Waterfall model, prototyping model, Incremental model, Spiral model, V model, component based, RAD model
	C	Agility, Agile Process models: Extreme Programming (XP), Adaptive Software Development (ASD), Scrum
	Unit 2	**Software Requirement Engineering**
	A	Requirement Engineering process, Elicitation techniques, Review and Management of User

		Needs, Types of Requirements
	B	Feasibility study, DFD, data dictionary ,decision tables
	C	Requirement Documentation: Characteristics of SRS, Document SRS according to IEEE standards, SRS case study
	Unit 3	**Software Design**
	A	Design Concepts, Design Strategies: Function Oriented Design, Object Oriented Design, Top- Down and Bottom-Up Design
	B	Effective modular design: Functional independence, Cohesion, Coupling, Design documentation
	C	UML Diagrams and Tools: Introduction to UML Diagrams, Use Case , Object and Class, Interaction diagram: Sequence & Collaboration , Introduction to Rational Rose tool
	Unit 4	**Software Implementation and Testing**
	A	Fundamental of testing: Objectives, principles, myths and facts, Error, Mistake, Bug, Fault and Failure, limitations of testing
	B	Levels of testing: Unit Testing, Integration Testing, System Testing, Acceptance Testing: Alpha & Beta Testing, Integration techniques
	C	White Box Testing, Black Box Testing, Verification and Validation, Test case designing, Guidelines for Coding, Debugging
	Unit 5	**Maintenance & Quality Management**
	A	Introduction to Maintenance , Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance
	B	Quality Concepts: Quality, Quality Control, Cost of Quality, Software Quality Assurance , SQA Plan , Software Reliability: Measures of Reliability and Availability, Software Safety
	C	Statistical Software Quality Assurance: Six Sigma, The ISO 9000 Quality Standards, Capability Maturity Model
	Mode of examination	Theory/Jury/Practical/Viva
	Weightage Distribution	CA: 25% | MTE: 25% | ETE: 50%
	Text book/s*	1. Pressman R S, Software Engineering: A Practitioners Approach, McGraw Hill.
	Other References	1. Datta S, Software Engineering: Concepts and Applications, Oxford University Press, 2010. 2. K.K. Aggrawal and Yogesh Singh, "Software Engineering", New Age International Publication 3 .Sommerville, Ian. "Software Engineering", Pearson(Latest Ed).

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: V**
1	Course Code	CSE354
2	Course Title	Design and Analysis of Algorithms
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Core
5	Course Objective	Objective of this course is to 1. Reinforce basic design concepts (e.g., pseudocode, specifications, top-down design) 2. Knowledge of algorithm design strategies 3. Familiarity with an assortment of important algorithms. 4. Enable students to analyze time and space complexity
6	Course Outcomes	Students will be able to: **CO1:Analyze** the asymptotic performance of algorithms **CO2**: **Describe** the dynamic-programming and Greedy paradigm and explain when an algorithmic design situation calls for it. **CO3: Demonstrate** a familiarity with major algorithms and data structures **CO4:Apply** important algorithmic design paradigms and methods of analysis **CO5:Discuss** NP-complete problems and develop algorithms to solve the problems. **CO6:Choose** appropriate algorithm design techniques for solving problems.
7	Course Description	This course introduces concepts related to the design and analysis of algorithms. Specifically, it discusses recurrence relations, and illustrates their role in asymptotic and probabilistic analysis of algorithms. It covers in detail greedy strategies divide and conquer techniques, dynamic programming and max flow - min cut theory for designing algorithms, and illustrates them using a number of well-known problems and applications.
8	Outline syllabus	
	Unit 1	**Introduction**
	A	Introduction : Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements
	B	Asymptotic Notations and their properties –Mathematical analysis for Recursive and Non- recursive algorithms, Recurrences relations, Master Method
	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
	Unit 2	**Dynamic Programming**
	A	Overview, Difference between dynamic programming and divide and conquer, All pair shortest path problems: Floyd-Warshall Algorithm
	B	Applications and analysis: Matrix Chain Multiplication, 0/1 Knapsack Problem

	C	Applications and analysis: Longest Common sub- sequence, Optimal Binary Search tree		
	Unit 3	**Greedy Method**		
	A	Overview of the Greedy paradigm, Analysis and example: task scheduling,		
	B	Fractional Knapsack problem, Single source shortest paths problem: Dijkastra's Algorithm, Bellman-ford Algorithm,		
	C	Overview and analysis of Backtracking & Branch and Bound: N-Queens problem and Sum of subsets		
	Unit 4	**Selected Topics**		
	A	Introduction to NP Complete and NP Hard Problems, Examples, Amortized Analysis		
	B	Approximation Algorithms – Travelling Sales Person Problem and Vertex Cover Problem, Randomized Algorithms, Randomized Quick Sort Algorithm		
	C	String Matching Algorithms – Naive String Matching Algorithm, Rabin Karp Algorithm.		
	Unit 5	**Advanced Data Structures**		
	A	Red-Black Trees - Definition, Applications, Insertion and deletion of elements in RB-Tree		
	B	B-Trees - Definitions, Applications, Insertion and Deletion in B-Trees		
	C	Data Structure for Disjoint Sets – Definition, Binomial Heaps, Fibonacci Heaps.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	2. Cormen et al., "Introduction of Computer Algorithms", Prentice Hall India		
	Other References	4. Sahni et al., "Fundamentals of Computer Algorithms", Galgotia Publications. 5. Hopcroft A, The Design And Analysis Computer Algorithms, Addison Wesley		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: V**
Course Code	**ECP392**
Course Title	Project Based Learning -3
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
Course Objective	1. To align student"s skill and interests with a realisticproblem orproject 2. To understand the significance of problem and its scope 3. Students will make decisions within a framework
Course Outcomes	Students will be able to: CO1: Illustrate practical knowledge within the chosen area oftechnology for project development CO2: Identify, analyze, formulate and handle programmingprojects with a comprehensive and systematic approach CO3: Discuss and accumulate the background information CO4: Develop effective communication skills forpresentation of project related activities CO5: Build as an individual or in a team indevelopment of technical projects CO6: Demonstrate effectively the module designed
Course Description	In PBL-3, the students will learn how to define the problemfor developing projects, identifying the skills required to develop the project based on given a set of specifications and all subjects of that Semester.
Outline syllabus	
Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.
Unit 2	Develop a work flow or block diagram for the proposed system / software.
Unit 3	Design Flow Chart for the proposed problem.
Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.
Unit 5	Demonstrate and execute Project with the team. Test the project modules.
Mode of examination	Practical/viva

Weightage Distribution	CA	CE	ETE
	25%	25%	25%
Text book/s*	Relevant publications		
Other References	Relevant publications		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: V**
1	Course Code	**ARP305**
2	Course Title	**Quantitative Apptitude Behavioural and Interpersonal Skills**
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
	Course Status	Active
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness program, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 3rd phase of employability enhancement and skill building activity exercise.
6	Course Outcomes	After completion of this course, students will be able to: CO1: Apply skills of personality development which will help a student groom to meet the needed social strata for establishing themselves in the society CO2: Build a positive behavioural attitude and attributes developing interpersonal skills for building positive and meaningful social and professional relationships CO3: Review and revise development plans to adapt to changing aspirations, circumstances and working environments CO4: Acquire higher level competency in use of numbers and digits, logical and analytical reasoning CO5: Develop higher level strategic thinking and diverse mathematical concepts through building cubes and cuboids. CO6: Demonstrate higher level quantitative aptitude such as analytical and statistical tools for making business decisions.
7	Course Description	This bundles Training approach attempts to explore the personality, character, and the natural style of the student. This helps to develop character, personality, confidence and interpersonal abilities within the student along with level 3 readiness in quant, aptitude and reasoning skills
8	Outline syllabus – ARP305	
	Unit 1	**Impress to Impact**
	A	What is Personality?| Creating a positive impression – The 3 V's ofImpression | Individual Differences and Personalities

	B	Personality Development and Transformation | Building Self Confidence| Behavioural and Interpersonal Skills		
	C	Avoiding Arguments | The Art of Assertiveness |Constructive Criticism |The Personal Effectiveness Grid | Assessing our Strengths & Limitations and Creating an Action Plan for Learning with the 4M Model | VerbalAbilities- 3		
	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**		
	A	Numbers & Digits , Mathematical Operations | Analytical Reasoning		
	B	Cubes & Cuboids | Statement & Assumptions		
	C	Strong & Weak Argument		
	Unit 3	**Quantitative Aptitude**		
	A	Work & Time ,Pipes & Cistern		
	B	Time ,Speed & Distance, Quadratic & Linear Equations, Logs &Inequalities		
	C	Sequence & Series, Logarithms, Data Interpretation | Data sufficiency - Level 1		
	Mode of examination	Practical/viva		
	Weightage Distribution	CA	CE	ESE
		25%	25%	50%
	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		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: V**
1	Course Code	ECP394 | Course Name: Industry Connect
2	Course Title	**Industry Connect**
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	1. Experience the activities and functions of business professionals. 2. Develop and refine oral and written communication skills. 3. Identify areas for future knowledge and skill development.
6	Course Outcomes	Students will be able to: CO1. Integrate the concepts and strategies of academic study in a real time environment. CO2. Identify, formulate and model problems and find engineering solution based on a systems approach. CO3. Develop teamwork and apply prior acquired knowledge in problem solving. CO4. Develop communication, interpersonal and other critical skills required for career growth. CO5. Practice engineer's responsibilities, self-understanding, self-discipline and ethical standards. CO6. Explore career alternatives prior to graduation.
7	Course Description	An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.
8	Outline syllabus	
	Unit 1	Define objectives and conditions for the internship, ensuring students that it is related to the study path carried out at the University
	Unit 2	Problem Definition and identification, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.
	Unit 3	The internship work plan is drawn up by developing team work and applies prior acquired knowledge in problem solving.
	Unit 4	Demonstrate and execute Project with the team. Submission of evaluation form and final report completed by the intern.
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: V**
1	Course Code	MRM001
2	Course Title	Research Methodology
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	To develop understanding of the basic framework of research process. To develop an understanding of various research designs and techniques. To identify various sources of information for literature review and data collection. To develop an understanding of the ethical dimensions of conducting applied research. Appreciate the components of scholarly writing and evaluate its quality.
6	Course Outcomes	CO1: Infer the mind-set of a researcher CO2: Design a research plan CO3: Apply different methods for data collection CO4: Analyze the collected data CO5: Compile relevant data and prepare a report CO6: Infer the process of research right from inception of idea to execution and documentation.
7	Course Description	The course aims to develop a research orientation among the scholars and to acquaint them with fundamentals of research methods. Specifically, the course aims at introducing them to the basic concepts used in research and to scientific social research methods and their approach. It includes discussions on sampling techniques, research designs and techniques of analysis.
8	Outline syllabus	
	Unit 1	**Introduction**
	A	Introduction to research – The role of research, research process overview
	B	Philosophies and the language of research theory building – Science and its functions, What is theory?, and The meaning of methodology

	C	Thinking like a researcher – Understanding Concepts, Constructs, Variables, and Definitions		
	Unit 2	**Research Problem and Hypotheses**		
	A	Defining the research problem, The importance of problems		
	B	Formulation of the research hypotheses, The importance of hypothesis		
	C	Experimental and Non-experimental research design		
	Unit 3	**Data Collection**		
	A	Field research, and Survey research		
	B	Methods of data collection– Secondary data collection methods		
	C	Methods of data collection– qualitative methods of data collection, and Survey methods of data collection		
	Unit 4	**Data Analysis**		
	A	Attitude measurement and scaling – Types of measurement scales; Questionnaire designing – Reliability and Validity		
	B	Sampling techniques – The nature of sampling, Probability sampling design, Non-probability sampling design, Determination of sample		
	C	Processing and analysis of data		
	Unit 5	**Report Writing**		
	A	Ethical issues in conducting research		
	B	Report generation and report writing		
	C	APA format – Title page, Abstract, Introduction, Methodology, Results, Discussion, References, and Appendices		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Chawla, Deepak & Sondhi, Neena (2011). Research methodology: Concepts and cases, Vikas Publishing House Pvt. Ltd. Delhi Bryman, Alan & Bell, Emma (2011). Business Research Methods (Third Edition), Oxford University Press.		
	Other References	Kerlinger, F.N., & Lee, H.B. (2000). Foundations of Behavioural Research (Fourth Edition), Harcourt Inc. Rubin, Allen & Babbie, Earl (2009). Essential Research Methods for Social Work, Cengage Learning Inc., USA.		

TERM-VI

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	**CSE353**
2	Course Title	**Compiler Design**
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Core
5	Course Objective	1. To provide students with an overview of the issues that arise in Compiler construction as well as to throw light upon the significant theoretical developments and tools that are deep rooted into computer science. 2. To introduce the major phases of Compiler construction and also its theoretical aspects including regular expressions, context-free grammars, Finite Automata etc.
6	Course Outcomes	After the successful completion of this course, students will be able to : **CO 1:Explain** the concepts and different phases of compilation with compile time error handling **CO 2:Represent** language tokens using regular expressions, context free grammar and finite automata and design lexical analyzer for a language **CO 3:Compare** top down with bottom up parsers, and develop appropriate parser to produce parse tree representation of the input **CO 4: Design** syntax directed translation schemes for a given context free grammar. **CO 5:Generate** intermediate code for statements in high level language, Benefits and limitations of automatic memory management. **CO 6:Apply**optimization techniques to intermediate code and generate machine code for high level language program
7	Course Description	To provide students with an overview of the issues that arise in Compiler construction as well as to throw light upon the significant theoretical developments and tools that are deep rooted into computer science.
8	Outline syllabus	
	Unit 1	Introduction
	A	Introduction to Compiler, Phases and passes, Bootstrapping, Cross-Compiler

	B	Finite state machines and regular expressions and their applications to lexical analysis		
	C	lexical-analyzer generator, Lexical Phase errors		
	Unit 2	**Parsing Techniques**		
	A	The syntactic specification of programming languages: Context free grammars, derivation and parse trees.		
	B	Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers. Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables		
	C	Constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars. Syntactic phase errors and semantic errors.		
	Unit 3	**Syntax Directed Translations And Intermediate Code Generation**		
	A	Syntax directed definition, Construction of syntax trees, syntax directed translation scheme		
	B	Variants of Syntax Trees, Three Address Codes		
	C	Translation of Expression, Type Checking and control flow.		
	Unit 4	**Symbol table**		
	A	Data structure for symbols tables, representing scope information.		
	B	Run-Time Administration: Implementation of simple stack allocation Scheme		
	C	Run Time Storage Management		
	Unit 5	**Code Generation And Optimization**		
	A	Sources of Optimization of basic blocks and flow graphs		
	B	Basic Blocks, Flow graphs, DAG		
	C	Global Data Flow Analysis		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	1. 1.Aho, Sethi, Ulman, compilers Principles, Techniques, and Tools, Pearson Education, 2003		
	Other References	1. Lauden, Principles of Compiler Construction. 2. D. M. Dhamdhere CompilerConstruction--Principles and Practice, Macmillan India,		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	CSP353
2	Course Title	Compiler Design Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	This laboratory course is intended to make the students experiment on the basic techniques of compiler construction and tools that can used to perform syntax-directed translation of a high-level programming language into an executable code. Students will design and implement language processors in C by using tools to automate parts of the implementation process. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, and object orientation.
6	Course Outcomes	CO1**Apply** different compiler writing tools to implement the different Phases CO2: **Understand** and define the role of lexical analyzer, use of regular expression and transition diagrams. CO3: **Implement** a parser for different context free grammars. CO4:**Construct** the intermediate representation CO5:**Implement** Symbol table CO6:**Compare** various code optimization techniques
7	Course Description	This self-paced course will discuss the major ideas used today in the implementation of programming language compilers, including lexical analysis, parsing, syntax-directed translation, abstract syntax trees, types and type checking, intermediate languages, dataflow analysis, Programme optimization, code generation, and runtime systems. As a result, you will learn how a Programme written in a high-level language designed for humans is systematically translated into a Programme written in low-level assembly more suited to machines
8	Outline syllabus	
	Unit 1	**Practical based on Designing of Finite Automata and Compiler construction tools**
		1. Design a DFA which will accept all the strings containing even number of 0's and even number of 1's over an alphabet {0, 1} and write a Programme to implement the DFA. 2. Design a DFA which will accept all the strings containing mod 3 of 0's over an alphabet {0, 1} and write a Programme to implement the DFA. 3. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines

	Unit 2	**Practical related to -- Parsing Techniques**		
		1. Write an algorithm and Programme on Recursive Descent parser. 2. Write an algorithm and Programme to compute FIRST and FOLLOW function. 3. Develop an operator precedence parser for a given language. 4. Implementation of shift reduce parsing algorithm and LR parser		
	Unit 3	**Practical related to--- Syntax Directed Translations And Intermediate Code Generation**		
		1. Write code to generate abstract syntax tree. 2. Intermediate Code Generation		
	Unit 4	**Practical related to---Symbol table**		
		Implement Symbol table		
	Unit 5	**Practical related to---Code optimization techniques**		
		1. Implementation of Directed Acyclic Graph 2. Implementation of Code Generation		
	Mode of examination	Jury/Practical/Viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*	Aho, Sethi, Ulman, compilers Principles, Techniques, and Tools, Pearson Education, 2003		
	Other References	Lauden, Principles of Compiler Construction. 3. D. M. Dhamdhere Compiler Construction--Principles and Practice, Macmillan India,		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	ECN302
2	Course Title	Embedded Systems and Robotics
3	Credits	3
4	Contact Hours (L-T-P)	3-0-2
	Course Status	Compulsory
5	Course Objective	To train the students for finding right microcontroller for a particular application and to Programme it. They will also be taught interfacing of different input/output devices with microcontrollers. An introduction of robotics of real time systems and development robotic system will be taught
6	Course Outcomes	CO1: Understand Basic architecture of embedded systems and its components CO2: Develop programs of embedded systems using instruction set and embedded C CO3: Construct interfacing & building techniques of embedded systems CO4: Interpret robotics sensors and transducers CO5: Developing interfacing circuits for robotics applications CO6: Application of embedded system and robotics
7	Course Description	The aim of the subject is to explore the fun of electronics in small applications. This subject makes to do small projects based on AVR microcontroller. It is basic controller which used in the Embedded Systems. The subject will be explained with open source software with simulation. So, students can enjoy the reality of the embedded system virtually. The subject is very useful to do their microcontroller based projects using AVR and others. Scoring of marks is very easy in the subject because of fun in the subject.
8	Outline syllabus	
	Unit 1	**Review of Microcontrollers Architecture**
	A	RISC Architecture, data memory and programming memory of AVR
	B	The general purpose registers status register and program counter register in AVR
	C	Addressing Modes of AVR instructions, review of assembly programming, pin diagram
	Unit 2	**Basics of Embedded C Programming**
	A	Introduction to embedded C programming, open source tools, debugging, HEX file and flash programmers
	B	Data types and time delay, Logic operations
	C	Data coversion, data serialization, memory allocation
	Unit 3	**Programming of Microcontrollers using Embedded C**
	A	Programming of input/output port, timers, interrupts
	B	Programming of serial port, ADC, and interfacing of LCD
	C	SPI protocol and I2C protocol, RTC

	Unit 4	**Introduction of Robotics**		
	A	History of robotics, Classification of robotics Basic components of robotics		
	B	Sensors –actuators & drive systems – Control Systems,		
	C	Degree of freedom, electrical power management (battery)		
	Unit 5	**Techniques and components for Robotics**		
	A	DC motor and stepper motor interfacings		
	B	PWM for velocity control, position encoders, position control interrupts, infrared sensors and receivers		
	C	ultrasonic range sensors, line follower system, Case study of Robotic Arm and Hexpod Robot		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Muhammad Ali Mazidi, AVR Microcontroller and Embedded Systems: Using Assembly and C, Pearson Education		
	Other References	S.R. Deb and S. Deb, “Robotics Technology and Flexible Automation”, Second edition, McGraw Hill, 2011		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: VI**
Course Code	**ARP 306**
Course Title	**Campus to Corporate**
Credits	2
Contact Hours (L-T-P)	0-0-4
Course Status	Active
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 enhanceemployability 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.
Course Outcomes	After completion of this course, students will be able to: CO1: Develop a creative resume, cover letters, interpret job descriptions and interpret KRA and KPI statements and art of conflict management. CO2: Build negotiation skills to get maximum benefits from deals in practical life scenarios. CO3: to Develop skills of personal branding to create a brand image and self-branding. CO4: Acquire higher level competency in use of logical and analytical reasoning such as direction sense, strong and weak arguments. CO5: Develop higher level strategic thinking and diverse mathematical concepts through building analogies, odd one out. CO6: Demonstrate higher level quantitative aptitude such as average, ratio & proportions, mixtures & allegation for making business decisions.
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

Outline syllabus – ARP 306

	Unit 1	**Ace the Interview**
	A	HR Sensitization (Role Clarity | KRA | KPI | Understanding JD) | Conflict Management
	B	Negotiation Skills | Personal Branding
	C	Uploading & Curating Resumes in Job Portals, getting Your Resumes Noticed | Writing Cover Letters | Relationship Management | Verbal Abilities-4

	Unit 2	**Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical**		
	A	Sitting Arrangement & Venn Diagrams | Puzzles | Distribution | Selection		
	B	Direction Sense | Statement & Conclusion | Strong & Weak Arguments		
	C	Analogies, Odd One out | Cause & Effect		
	Unit 3	**Quantitative Aptitude**		
	A	Average , Ratio & Proportions, Mixtures & Allegation		
	B	Geometry-Lines, Angles & Triangles		
	C	Problem of Ages | Data Sufficiency - L2		
	Weightage Distribution	CA	CE	ESE
		25%	25%	50%
	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		

School: SSET	**Batch: 2023-2027**
Programme :	**B.Tech.**
Branch: ENC	**Semester: VI**
Course Code	**ECP394**
Course Title	Project Based Learning -4
Credits	1
Contact Hours (L-T-P)	0-0-2
Course Status	Compulsory
Course Objective	1. To align student‟s skill and interests with a realisticproblem or project 2. To understand the significance of problem and its scope 3. Students will make decisions within a framework
Course Outcomes	Students will be able to: CO1: Acquire practical knowledge within the chosen area oftechnology for project development CO2: Identify, analyze, formulate and handle programmingprojects with a comprehensive and systematic approach CO3: Discuss and accumulate the background information CO4:Develop effective communication skills forpresentation of project related activities CO5: Contribute as an individual or in a team indevelopment of technical projects CO6: Demonstrate effectively the module designed
Course Description	In PBL-1, the students will learn how to define the problemfor developing projects, identifying the skills required to develop the project based on given a set of specificationsand all subjects of that Semester.

Outline syllabus	
Unit 1	Problem Definition, Team/Group formation and Project Assignment. Finalizing the problem statement, resource requirement, if any.
Unit 2	Develop a work flow or block diagram for the proposed system / software.
Unit 3	Design Flow Chart for the proposed problem.
Unit 4	Implementation of work under the guidance of a faculty member and obtain the appropriate results.
Unit 5	Demonstrate and execute Project with the team. Test the project modules.
	Report should include Abstract, Hardware / Software Requirement, Problem Statement, Design/Algorithm, Implementation Detail & Test Reports. References if any. The presentation, report, work done during the term supported by the documentation, forms the basis of assessment.

	Mode of examination	Practical/viva		
	Weightage Distribution	CA	CE	ETE
		25%	25%	50%
	Text book/s*			
	Other References			

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	ECE947
2	Course Title	CMOS Design
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
Course Status		Core
5	Course Objective	1. To understand the concept of MOS transistors 2. To design different circuits using CMOS transistors 3. To understand and analyze delays in CMOS. 4. To understand the differences between different logic families.
6	Course Outcomes	After completion of this course student will able to: CO1:Basics of (MOSFET) device operation and device physics CO2: Understanding of MOS transistor models CO3: Design different CMOS circuits using various logic families along with their circuit layout. CO4:Analyse delays and power of a CMOS circuit is calculated CO5: Compare the different of logic design approaches. CO6: Analyse the physical design process of VLSI design flow.
7	Course Description	This course provides the student with the analytical skills required for the analysis, design and physical layout of digital integrated circuits. The course is preparatory for study in the field of Very Large Scale Integrated (VLSI) digital circuits and engineering practice.
8		Outline syllabus
	Unit 1	**Introduction to MOSFETs**
	A	Review of MOS transistor models
	B	Non-ideal behaviour of the MOS Transistor
	C	Transistor as a switch
	Unit 2	**CMOS Inverter**
	A	Inverter characteristics
	B	Integrated Circuit Layout: Design Rules
	C	Parasitic
	Unit 3	**Delay Calculation**
	A	Delay: RC Delay model
	B	linear delay model
	C	logical path efforts

	Unit 4	**Layout and other Calculations**		
	A	Power in CMOS circuit layout		
	B	Interconnect in CMOS circuit layout		
	C	Robustness in CMOS circuit layout		
	Unit 5	**CMOS Combinational and Sequential Circuits**		
	A	CMOS logic families static		
	B	dynamic and dual rail logic		
	C	Sequential Circuit Design: Static circuits. Design of latches and Flip-flops.		
Mode of examination		Theory		
Weightage Distribution		CA	MTE	ETE
		25%	25%	50%
Text book/s*		1.N.H.E. Weste and D.M. Harris, CMOS VLSI design: A Circuits and Systems Perspective, 4thEdition, Pearson Education India, 2011- ISBN: 9780321547743		
Other References		2.C.Mead and L. Conway, Introduction to VLSI Systems, Addison Wesley, 1983- ISBN: 9788820443993 3.J. Rabaey, Digital Integrated Circuits: A Design Perspective, Prentice Hall India, 2008- ISBN: 9780132219105. 4.L. Glaser and D. Dobberpuhl, The Design and Analysis of VLSI Circuits, Addison Wesley, 2007-ISBN:9780395370681		

TERM – VII

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: VII**
Course Code	**ECE491**
Course Title	Major Project -1
Credits	2
Contact Hours (L-T-P)	0-0-0
Course Status	Compulsory
Course Objective	Project being the student‟s last activity at the institution, it fulfills a purpose of synthesis ofall the knowledge they have acquired throughout the different years. In addition, this knowledge must be used in a particular way, in order to solve a specific problem, which lets student demonstrate their aptitude by applying this knowledge.
Course Outcomes	Students will be able to: CO1: Identify problem statement in engineering and technology in selected field of interest.CO2: Analyze the gathered information required to develop a project. CO3: Participate in different teams and to focus on getting a working project done on timewith each student being held accountable for their part of the project. CO4: Prepare the designs requirements, functional and conceptual design CO5: Initiate the actual implementation of the project work to produce the deliverables CO6: Communicate project work effectively with at large in written and oral forms, preferably research paper/patent/technical competitions, as a part of the project work.
Course Description	The object of Major Project-I is to enable the student to take up investigative study in the broad field of Electronics & Communication Engineering, either fully theoretical/practical or involving both theoretical and practical work to be assigned by the Department on anindividual basis or two/three students in a group, under the guidance of a Supervisor.
Outline syllabus	
Unit 1	Problem identification, Literature survey/Gather & analyze information from multiple sources
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/ Ganttcharts/CPM/PERT Networks. Creating System Requirement Specifications (Functional & Non Functional)
Unit 3	Preparing Design: Circuit Diagrams, Use of appropriate tools and techniques for project design
Unit 4	Identify and Implement Project Modules.
Unit 5	Use of appropriate tools/technologies for coding the modules

	Report on final problem statement, specifications, project schedule, final concept design and project schedule Report and Presentation - Project Modules development. Communicate project work effectively with at large in written and oral forms, preferably research paper/patent/technical competitions, as a part of the projectwork.		
Mode of examination	Practical/viva		
Weightage Distribution	CA	CE	ETE
	25%	25%	50%

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VII**
1	Course Code	ECP481
2	Course Title	Industrial Internship
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
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, self learning 4. Effective communication and so on. Learn practically about team-work, collaboration, and leadership.
6	Course Outcomes	Students will be able to: CO1: Apply the technical knowledge learned in classrooms in real industrial situations and problems. CO2: Expose themselves to the engineer's responsibilities and ethics in carrying out internship workflow plan. CO3: Practice communication and teamwork skills. CO4: Demonstrate strategies like time management, multi-tasking approaches to problem solving. CO5: Identify career preferences and professional goals. CO6: Evaluate and use appropriate methods and professional standards in computing practice.
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	
	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
	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.
	Unit 3	Project during Internship involves: a) project activated by the Programme 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.			
	Unit 4	Submission of evaluation form and final report completed by the intern.			
	Unit 5	Final evaluation form completed by the supervisor at the Host Organization and final presentation before departmental committee.			
	Mode of examination	Practical			
	Weightage Distribution	CA	MTE	ETE	
		25%	NIL	75%	

TERM – VIII

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: VIII**
Course Code	**ECE492**
Course Title	Major Project -2
Credits	8
Contact Hours (L-T-P)	0-0-16
Course Status	Compulsory
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
Course Outcomes	Students will be able to: CO1: Demonstrate the implementation of the project. CO2: Identify the test procedure for each implemented module. CO3: Deploy and evaluate the modules to verify the required need of the project. CO4: Use different tools for testing and report writing. CO5: Develop the attitude and ethics of a professional engineer. CO6:Communicate project work effectively with at large in written and oral forms, preferably research paper/patent/technical competitions, as a part of the project work.
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.

Outline syllabus

Unit 1	Complete the implementation of the project. Testing of the modules, Use of appropriate tools/techniques for testing
Unit 2	Deploy & demonstrate developed modules of the project
Unit 3	Preparing a Project Report in the standard format for being evaluated by the Supervisor
Unit 4	Submission of Project and Report to Departmental Committee
Unit 5	Final Presentation before Departmental Committee.Communicate project work effectively with at large in written and oral forms, preferably research paper/patent/technical competitions, as a part of the project work.
Mode of Examination	Practical/viva

Weight age Distribution	CA	CE	ETE
Text book/s*	25%	25%	50%
	Relevant PublIcations		

PROGRAMME ELECTIVE

LIST OF PROGRAMME ELECTIVE FOR ELECTRONICS AND COMPUTER ENGINEERING

S. No	Course Code	Course Name	L	T	P	C	Category
1	PE1	Principles of Operating Systems	2	0	2	3	DSE
2	PE2	Microprocessor and Microcontroller with interfacing	2	0	2	3	DSE
3	PE3	Computer Network	3	0	0	3	DSE
4	PE4	Wireless Sensor Network/ Introduction to Cloud Computing/ Cryptography and network security	3	0	0	3	DSE
5	PE5	Android Application Development/ Web Technologies/ Analog and Digital Communication	2	0	2	3	DSE
6	PE6	3D Printing and Software Tools/ Introduction to Internet of Things	1	0	2	2	DSE
7	PE7	Real Time Embedded System /Artificial Intelligence for IoT	2	0	2	3	DSE
TOTAL CREDITS TO BE TAKEN						**20**	

School: SSET	**Batch: 2023-2027**	
Programme:	**B.Tech.**	
Branch: ENC	**Semester: IV/V**	
1	Course Code	CSE254
2	Course Title	Principles of Operating System
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Elective
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 to : **CO1:** Understand the basic concept of Operating system. **CO2:**Explore process management concepts including scheduling, synchronization, deadlocks **CO3:** To understand and implement algorithms in resource allocation and utilization. **CO4:** To integrate and interpret effectiveness, efficiency of algorithms used for resource management of operating systems. **CO5:**Analyze various memory management and virtual memory techniques **CO6:** Analyze file and disk management.
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
	B	Types of Operating Systems (Batch, Multiprogramming ,Multi Tasking , Multiprocessing, Distributed and Real Time Operating System)
	C	Operating System Structure(Monolithic, Layered and Microkernel), Operating System Services
	Unit 2	**Process Synchronization**

	A	Process Concepts (PCB, Process States , Process Operations, Inter process communication)		
	B	Critical Section problem & their solutions, Introduction to Semaphores		
	C	Classical Problems of Synchronization(Producer Consumer Problem, Readers Writer Problem, Dining philosophers problem)		
	Unit 3	**CPU Scheduling**		
	A	Concept , Types of schedulers(Short term, Long term, Middle term), Dispatcher, Performance Criteria		
	B	CPU Scheduling Algorithms(FCFS, SJF, Priority, Round Robin, Multilevel Queue, Multilevel feedback Queue)		
	C	Deadlock concepts& Handling Techniques(Avoidance, Prevention and Detection & Recovery)		
	Unit 4	**Memory Management**		
	A	Memory Hierarchy, Memory Management Unit		
	B	Paging, Segmentation		
	C	Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU)		
	Unit 5	**INPUT-OUTPUT Management**		
	A	Input –Output interface, Modes of data transfer(Programmed, interrupt and DMA)		
	B	Disk structure , Disk scheduling(FCFS,SSTF, SCAN, LOOK,C-SCAN, C-LOOK)		
	C	File Concept ,File operations, File Directories, Case study of Windows Operating System		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	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		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV/V**
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 multitasking environment. CO2: Identify and use utilities of Windows & Unix operating systems CO3: Use the resources of operating system i.e. process management and file management CO4: Writing programs on Process creation, multiple process creation, process synchronization, CO5: Writing Programme on basic file operations CO6: Writing Programme on file buffering.
7	Course Description	The course is designed to make the students research/industry ready as operating systems are indispensable for the systems used in industries/research organizations. New operating systems for different gadgets are launched in last few years. So the students will get the design principles operating system in this course.
8	Outline syllabus	
	Unit 1	**Introduction**
		Illustration of Different types of operating system: Single user Multi task, Multi user Multi task
		Basic Windows features & Unix commands.
	Unit 2	**Processes**
		Process basics: Creating processes using fork( ), the parent-child processes PID, PPID, process states: creating orphan, zombie processes.
	Unit 3	**Process Synchronization**
		Creating multiple processes, Process table, use the command ps with –el, Synchronization of processes by using sleep( )& wait( ), background process,
	Unit 4	**Files**
		Basic file operations, Programs for File operations, sharing data between processes using files.
	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.

	Mode of examination	Practical		
	Weightage	CA	CE	ETE
	Distribution	25%	25%	50%
	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		

School: SSET	**Batch: 2023-2027**
Programme:	**B.Tech.**
Branch: ENC	**Semester: IV/V**
Course Code	ECE359
Course Title	Microprocessor and Microcontroller with Interfacing
Credits	2
Contact Hours (L-T-P)	2-0-0
Course Status	Elective
Course Objective	To identify and realize the basic features of basic microcontrollers. To learn programming of 8051 using Assembly language. To design a real time module interfacing. Development of a projects based on interfacing. Integrating of different real time modules interfacing with a microcontroller
Course Outcomes	After successful completion of this course the student will be able to: CO1: Interpret the features, functioning of basic 8-bit microprocessor andcomparison with microcontroller CO2: Illustrate addressing modes and concept of programming CO3: Apply assembly language programming of microcontrollers usingprogramming tools CO4: Access and develop interfacing with different modules like memory, ADC, DAC, LCD, stepper motor etc. CO5: Design the interfacing with communication modules CO6: Apply the concept of microcontroller in the field of IoT and other application
Course Description	This course introduces microprocessor architecture and microcomputer systems,including memory and input/output interfacing. Topics include assembly language programming, bus architecture, bus cycle types, I/O systems, memory systems, interrupts, and other related topics. Upon completion, students should be able to interpret, analyse, verify, and troubleshoot fundamental microprocessor circuits and programs using appropriate techniques and test equipment.
Outline syllabus	
Unit 1	**Fundamentals of Microprocessors**
A	Fundamentals of Microprocessor Architecture. 8-bit Microprocessor
B	Addressing Modes and Instruction set of 8085
C	Introduction to microcontroller; compare microcontroller. and microprocessor, Overview of the 8051 family.
Unit 2	**The 8051 Architecture**
A	Internal Block Diagram, CPU, ALU, address, data and control bus, Working registers, SFRs

	B	Clock and RESET circuits, Stack and Stack Pointer, Programme Counter, I/O ports,		
	C	Memory Structures, Data and Programme Memory, Timing diagrams and Execution Cycles		
	Unit 3	**Instruction Set and Programming**		
	A	Addressing modes: Introduction, Instruction syntax, Data types, Subroutines Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Relative addressing, Indexed addressing, Bit inherent addressing, bitdirect addressing		
	B	8051 Instruction set, Instruction timings. Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions Bitmanipulation instruction		
	C	Assembly language programs, C language programs. Assemblers and compilers. Programming and debugging tools.		
	Unit 4	**Memory and I/O Interfacing**		
	A	Memory and I/O expansion buses, control signals, memory wait states		
	B	Interfacing of peripheral devices such as General Purpose I/O, ADC, DAC, timers, counters, memory devices.		
	C	LED, LCD and keyboard interfacing, Stepper motor interfacing, DC Motor interfacing, sensor interfacing.		
	Unit 5	**External Communication Interface**		
	A	Synchronous and Asynchronous Communication		
	B	RS232, SPI, I2C		
	C	Introduction and interfacing to protocols like Blue-tooth and Zig-bee.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	M. A.Mazidi, J. G. Mazidi and R. D. McKinlay, "The8051Microcontroller and Embedded Systems: Using Assembly and C",PearsonEducation, 2013- ISBN: 9781292026572		
	Other References	1. K. J. Ayala, "8051 Microcontroller", Delmar Cengage Learning,2004-ISBN:9780314772787 2. R. S. Gaonkar, ", Microprocessor Architecture:Programming and Applications with the 8085", Penram International Publishing, 2002- ISBN:9780130340016		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: IV/V**
1	Course Code	ECE362
2	Course Title	Computer Network
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Elective
5	Course Objective	1. To educate basic knowledge of networking technologies and network management concepts. 2. To interpret the layering concepts in computer networks. 3. To analyse the functions of each layer and gain knowledge in different applications that use computer networks. 4. To emphasize the hand-on experience of network topology in a laboratory environment. 5. To be familiar with contemporary issues in networking technologies.
6	Course Outcomes	After successful completion of this course the student will be able to: CO1: Understand the concepts of networking thoroughly. CO2: Understand the data link layer functionality CO3: Analyse the performance of the network. CO4: Investigate Quality control mechanisms. CO5: Analyse the various switching technologies. CO6: Analyze performance issues in computer networking.
7	Course Description	The main emphasis of this course is on the organization and management of local area networks (LANs). The course objectives include learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems. The course introduces computer communication network design and its operations. The course includes the following topics: Open Systems Interconnection (OSI) communication model; error detection and recovery; local area networks; bridges, routers and gateways; network naming and addressing; and local and remote procedures. On completion of the course, the student should be able in part to design, implement and maintain a typical computer network (LAN).
8	Outline syllabus	
	Unit 1	**Introduction to computer networks and the Internet**
	A	Goals and application of Networks, LAN,MAN,WAN
	B	Protocol Hierarchies, Layered architecture.

	C	The OSI reference model, TCP/IP reference model, Internet.		
	Unit 2	**Data Link Layer**		
	A	Data link layer design issues, Flow control, and Error control.		
	B	Data link layer protocols, stop-and-wait protocol, Sliding window protocol, Go-back-N protocol, HDLC, PPP.		
	C	Media access sub layer, MAC protocols-ALOHA, slotted ALOHA, Carrier sense multiple access protocol.		
	Unit 3	**Network layer and Transport layer**		
	A	Router, Internet Protocol, Routing algorithms, Broadcast and Multicast routing		
	B	Connectionless transport - User Datagram Protocol, Connection oriented transport – Transmission ControlProtocol		
	C	IP, sub-netting, subnet mask.		
	Unit 4	**Congestion Control and Resource Allocation**		
	A	Issues in Resource Allocation, Queuing Disciplines		
	B	TCP congestion Control, Congestion Avoidance Mechanisms		
	C	Quality of Service		
	Unit 5	**Switching in networks**		
	A	Classification and requirements of switches, a generic switch,		
	B	Circuit Switching, Time-division switching, Space-division Switching		
	C	Packet switching, Blocking in packet switches, Three generations of packet switches		
	Mode of Examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Andrew Tanenbaum, “Computer networks”, Prentice Hall, 2011- ISBN: 9780132553179		
	Other References	1. B. A. Forouzan, “Data Communications and Networking”,Tata McGraw Hill, 4th Edition,2006- ISBN: 9780073250328 2. T. Viswanathan, “Telecommunication Switching Systemand Networks”, Prentice Hall- ISBN:9788131764640 3. S. Keshav, “An Engineering Approach to Computer Networking” , Pearson Education- ISBN:9788131711453		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	ECE934
2	Course Title	Wireless Sensor Network
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Elective
5	Course Objective	1. Knowledge of mobile ad hoc networks, design and implementation issues, and available solutions. 2. Knowledge of routing mechanisms and the three classes of approaches: proactive, on-demand, and hybrid. 3. Knowledge of clustering mechanisms and the different schemes that have been employed, e.g., hierarchical, flat, and leaderless. 4. Knowledge of the 802.11 Wireless LAN (WiFi) and Bluetooth standards. This includes their designs, operations, plus approaches to interoperability.
6	Course Outcomes	After completion of this course student will able to: CO1: Identify emerging research areas in the field of sensor networks CO2: Identify the issues and challenges in WSN CO3: make use of MAC protocols for communication in WSN CO4: Explore various dissemination protocols for WSN CO5: analyse the design principles of wireless sensor networks for a given application CO6: Design wireless sensor networks for a various application
7	Course Description	A wireless sensor network (WSN) generally consists of compact low power sensors, which collect information and pass the information via wireless networks to achieve a high level of desired monitoring and control in coordinated manners. WSN applications can be found in areas such as environmental monitoring, smart energy systems, battle field surveillance, home automation, medical monitoring, mobile computing, etc. WSN has integrated network engineering, embedded system engineering and sensor technology.
8	Outline syllabus	
	Unit 1	**Introduction to Sensor Networks**
	A	Introduction to Sensor Networks, unique constraints and challenges
	B	Advantage of Sensor Networks, Applications of Sensor Networks
	C	Types of wireless sensor networks
	Unit 2	**Issues and challenges in wireless sensor networks**
	A	Mobile Ad-hoc Networks (MANETs) and Wireless Sensor Networks

	B	Enabling technologies for Wireless Sensor Networks		
	C	Issues and challenges in wireless sensor networks		
	Unit 3	**Routing protocols**		
	A	Routing protocols, MAC protocols: Classification of MAC Protocols,		
	B	S-MAC Protocol, B-MAC protocol,		
	C	IEEE 802.15.4 standard and Zig Bee		
	Unit 4	**Dissemination protocol for large sensor network**		
	A	Dissemination protocol for large sensor network. Quality of a sensor network		
	B	Data dissemination, data gathering, and data Fusion		
	C	Real-time traffic support and security protocols.		
	Unit 5	**Design Principles for WSNs**		
	A	Design Principles for WSNs, Gateway Concepts Need for gateway, WSN to Internet Communication, and Internet to WSN Communication		
	B	Single-node architecture, Hardware components & design constraints		
	C	Operating systems and execution environments, introduction to TinyOS and nesC.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	Waltenegus Dargie , Christian Poellabauer, “Fundamentals Of Wireless Sensor Networks Theory And Practice”, By John Wiley & Sons Publications ,2011		
	Other References	1. Sabrie Soloman, “Sensors Handbook" by McGraw Hill publication. 2009 2. Feng Zhao, Leonidas Guibas, “Wireless Sensor Networks”, Elsevier Publications,2004 3. Kazem Sohrby, Daniel Minoli, “Wireless Sensor Networks”: Technology, Protocols and Applications, Wiley-Inter science 4. Philip Levis, And David Gay "TinyOS Programming” by Cambridge University Press 2009		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	CSE021
2	Course Title	Introduction to Cloud Computing
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Programme Elective
5	Course Objective	This introductory course on Cloud computing will teach both the fundamental concepts of how and why Cloud systems works, as well as Cloud technologies that manifest these concepts.
6	Course Outcomes	At the end of the course, students will have achieved the following learning objectives. CO1. Define the basics of cloud and recall the computer Science concepts which are helpful in understanding on demand service architecture. CO2. Classify and describe the architecture and taxonomy of parallel and distributed computing, including shared and distributed memory, and data and task parallel computing. CO3. Apply the PAAS and SAAS to manage the workflow and use of cloud in scientific application. CO4. Categorize and Characterize between Infrastructure services, deployment models, and governance in cloud computing. Examine the design of task and data parallel distributed algorithms for Clouds and use them to construct Cloud applications. CO5. Evaluate the importance of cloud using monitoring and management of services for performance improvement of HPC and to follow the Governance and Compliances. CO6. Elaborate the design concept and formulate to build the solution using cloud service providers as AWS, MS Azure, Google Cloud.Demonstrate the use of Map-Reduce, Vertex-Centric and Continuous Dataflow programming models.

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

		Storage in Cloud Computing, Cloud Storage, Technologies for Data Security in Cloud Computing
	Unit 3	**PLATFORM AND SOFTWARE AS A SERVICE**
	A	**Aneka and CometCloud** Aneka—Integration of Private and Public Clouds, Technologies and Tools for Cloud Computing, Aneka Cloud Platform, CometCloud: An Autonomic Cloud Engine, Introduction of CometCloud (Architecture, Autonomic Behavior, Applications overview)
	B	**Business Solutions and WorkFlow** Cloud-Based Solutions for Business Applications (Introduction of Enterprises Demand and Cloud Computing, Dynamic ICT Services), Workflow Engine for Clouds, Workflow Management Systems, Architecture of Workflow Management Systems
	C	**Scientific Applications and MapReduce Model** Scientific Application for Cloud Environments, Classification of Scientific Applications and Services in the Cloud, SAGA-based Scientific Applications, MapReduce Programming Model, MapReduce Impacts and Research Directions
	Unit 4	**MONITORING, MANAGEMENT & GOVERNANCE**
	A	**SLA Management in Cloud Computing** Introduction of typical Use Cases, Model for Federated Cloud Computing, Security Considerations, SLA Management in Cloud Computing: A Service Provider's Perspective, Types of SLA, Life Cycle of SLA, Automated Policy-based Management
	B	**Performance Predictions for HPC on Clouds** Introduction and Background of Grid and Cloud, HPC in the Cloud: Performance-related Issues, Game Hosting on Cloud Resources, Building Content Delivery Networks Using Clouds, Resource Cloud Mashups
	C	**Security and Governance** Basic Concept of Organizational Readiness, Drivers for Changes: Common Change Management Models, Security and Risk in the Cloud, Cloud Computing and Identity, Content Level Security—Pros and Cons, Legal Issues in Cloud Computing(PCI DSS), Data Privacy and Security Issues
	Unit 5	**AWS, MS AZURE AND GOOGLE CLOUD**

	A	AWS Services:EC2, IAM, S3, Lambda, EBS, CDN, CloudWatch,		
	B	MS Azure Services:Azure VM , SQL Server on Virtual Machines, Azure SQL Database,Azure Active Directory, Azure Backup		
	C	Google Cloud: Compute Engine,Migrate for Compute Engine, Cloud Functions, Gsuite Admin,Cloud Lab Balancing ,Cloud Storage		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	CLOUD COMPUTING Principles and Paradigms, Edited by Rajkumar Buyya, Jam Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	CSE032
2	Course Title	Cryptography and Network Security
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
5	Course Objective	The objective of this course is to provide an intention to explain basic concepts and algorithms of symmetric &asymmetric key cryptography, including encryption/decryption and key exchange with the application of cryptography and technique.
6	Course Outcomes	On successful completion of this module students will be able to: CO1: Identify the basic concepts of computer security, algorithms of symmetric Key cryptography, including encryption/decryption. CO2: Apply the tools and methodologies used to perform mathematic concepts behind the cryptographic algorithms.. CO3: Explain the tools and methodologies used to perform Security analysis. CO4: Interpret use of cryptographic data integrity algorithms and user authentication protocols CO5: Examine security at application layer, transport layer and network layer. CO6: Compare various algorithm of cryptography used for Network Security.
7	Course Description	This course will provide a deterministic approach of both the principles and practice of cryptography & network security. It covers the basic issues to be addressed by a network security capability, and explored by providing a tutorial and survey of cryptography and network security technology.
8	Outline syllabus	
	Unit 1	**Introduction& symmetric Key Cryptography**
	A	Computer Security Concepts- OSI security Architecture, Security attacks, Services, mechanism, model of network security
	B	Classical encryption techniques- Substitution Cipher(Mono-alphabetic, Poly-alphabetic), Transposition cipher, Stegnography
	C	Block Cipher- Encryption Principles, DES and its variants, strength of DES

	Unit 2	**Mathematics of Cryptography**		
	A	Eucledian, Extended Eucledian Algorithm, EuilersTotient Function , Ferment little Theorem, Eulers theorem		
	B	Primality Testing-Miller Rabin test, Chinese Remainder Theorem		
	C	Exponential- square and multiply method, Discrete Logarithm		
	Unit 3	**Asymmetric Cryptography & Key Exchange**		
	A	Public Key cryptography-RSA, Cryptanalysis of RSA		
	B	Elgamal cryptography, Elliptic Curve cryptography		
	C	Key Management and distribution : KDC, Diffie Hellman Key Exchange		
	Unit 4	**Digital signatures**		
	A	User Authentication protocol- Kerberos		
	B	Digital Signature –RSA, Elgamal, DSS		
	C	Data integrity algorithms-Hash Functions, MD5, SHA-512		
	Unit 5	**Security**		
	A	Security at Application layer-Email Architecture, S/MIME, PGP- Scenarios, key rings		
	B	Security at Transport layer-SSL(Services, Protocols)		
	C	Security at Network layer-IPSec(Modes, Security Protocols-AH, ESP, Services provided by IPSEC)		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	1. Atul Kahate , "Network Security ", Wiley India Pvt Ltd, 2010. 2. Michael T. Simpson, "Hands-on Cryptography & Network Security & Network Defense", Course Technology, 2010. 3. Rajat Khare, "Network Seuciryt and Cryptography & Network Security ", Luniver Press, 2006.		
	Other References	1. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2001. 2. Behrouz A. Forouzan, “Cryptography And Network Security”- McGraw Hill 1. Internet as a resource for reference.		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	CSE023
2	Course Title	Android Application Development
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Programme Elective
5	Course Objective	1. Basics of Android OS 2. Develop Basic and advance Android Apps
6	Course Outcomes	CO1: Define anatomy of an android application. CO2: Compare different components of Android Application CO3: Develop various android applications related to layouts and rich uses interactive interfaces. CO4:Analyze essential android programming concept CO5: Access and work with databases under an android operating system. CO6: Develop Basic and advance android app development for android devices.
7	Course Description	This android development course will help students to Understand the basis of Android Platform and its lifecycle. This will help them to implement simple GUI applications, use built-in components and work with database to store the data.
8	Outline syllabus	
	Unit 1	**Introduction and Architecture of Android**
	A	History of Android, Features of Android, Open Handset Alliance (OHA) , Advantages of Android
	B	Android Directory Structure, Architecture of Android.
	C	Structure of Manifest files,
	Unit 2	**Components of Android**
	A	Activity, Activity life cycle
	B	Services, service life cycle
	C	Content Provider, Broadcast receivers
	Unit 3	**User Interfaces**
	A	Layouts-Linear layout, Relative layout, Constraint layout, Table layout
	B	Input Controls – Text input, Checkboxes, Radio buttons, Button, Spinner, Toggle buttons
	C	Dialog, date picker, Time picker
	Unit 4	**Intent & Notification**

	A	Intents, Intent Filter		
	B	Implicit intent, Explicit Intent		
	C	Notification		
	Unit 5	**Working with SQL Lite**		
	A	Introduction to SQLite database, Steps for connecting application with database.		
	B	Fetch and update data in database from application,		
	C	Cursor and content value, opening and closing database		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	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		

School: SSET		**Batch: 2023-2027**		
Programme:		**B.Tech.**		
Branch: ENC		**Semester: VI**		
1	Course Code	CSP023		
2	Course Title	Android Application Development Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Programme Elective		
5	Course Objective	1. Basics of Android OS 2. Develop Basic and advance Android Apps 3. Publishing and Monetizing the app		
6	Course Outcomes	CO1: Demonstrate and understanding anatomy of an android application. CO2:Develop various android applications related to layouts and rich uses interactive interfaces. CO3:Apply essential android programming concept CO4: Distinguish and compare different components of Android CO5: Access and work with databases under an android operating system. CO6: Develop Basic and advance android app development for android devices.		
7	Course Description	This android development course will help students to Understand the basis of Android Platform and its lifecycle. This will help them to implement simple GUI applications, use built-in components and work with database to store the data.		
8	Outline syllabus			
	Unit 1	**Introduction and Architecture of Android**		
	A	Basic Programme to study the directory structure of android		
	Unit 2	**User Interfaces**		
	A	Programs to develop UI for android app		
	Unit 3	**Components of Android**		
	A	Programme using different component of android		
	Unit 4	**Working with SQL Lite**		
	A	Programme used to store and retrieve data from database		
	Unit 5	**Sensors and Animation**		
	A	Programme based on sensor and animation		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage	CA	CE	ETE

	Distribution	25%	25%	50%
	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		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course No.	ENC912
2	Course Title	Analog and Digital Communication
3	Credits	3
4	Contact Hours (L-T-P)	2-0-2
5	Course Objective	The main objectives of the course are • To understanding the need of Modulation. • To undestand various analog modulation Tehniques . • To understand various pulse modulation and digital Modulation Techniques • To know about various multiplexing techniques and various transmission media. • To understand the principles of Radio and Optical Fibre Communication
6	Course Outcomes	After completing this course students will be able CO1: Understand the need of modulation process, AM, FM and PM techniques. CO2: Comprehend various techniqes of Pulse Modulation. CO3: Analyze various techniques of Digital Modulation Techniques. CO4: Analyze the TDM, FDM and other techniques of multiplexing. CO5: Analyze radio and optical fibre communication CO6: Apply various techniques to real time problems.
7	Outline syllabus:	
	Unit 1	**Fundamentals of Analog Modulation**
	A	Introduction to communication systems ;Need and types of Modulation
	B	Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation. Types of AM techniques
	C	Angle modulation - FM and PM mathematical analysis, waveforms, frequency deviation and percent modulation, phase deviation and modulation index, Comparision of AM, FM and PM
	Unit 2	**Pulse Modulation Techniques**
	A	Introduction and types of Pulse Modulation ; Pulse Amplitude Modulation
	B	Pulse width Modulation (PWM), Modulation(PAM)

		Modulation ,Pulse Position Modulation (PPM)
	C	Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM)
	Unit 3	**Digital Modulation Techniques**
	A	Introduction to Digital modulation , Advantages and Disadvantages of digital communication, Application
	B	Information Theory, Capacity
	C	Amplitude Shift Keying(ASK)Frequency Shift Keying(FSK), Phase Shift Keying (PSK)
	Unit 4	**Multiplexing Techniques**
	A	Multiplexing of signal transmission media, introduction to TDM, FDM and Space Division Multiplexing
	B	Basic schemes of FDM.
	C	Basic schemes of TDM and Comparison with FDM
	Unit 5	**Radio and Optical Fibre Communication**
	A	Types of radio communication, Microwave Communication
	B	Satellite radio communication
	C	Optical fiber communication system

8	Mode of examination	Theory		
8.1	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
9	Textbook	Simon Haykins, “Communications Systems ”,Wiley India. Kennedy and Davis , “Electronic Communications Systems ”, TMH .Wayne		
9.1	References	Tomasi, “Electronic Communications Systems ”, Pearson Education . Willam Schweber, Electronic Communications Systems ”, PHI Learning		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VI**
1	Course Code	CSE 024
2	Course Title	Web Technologies
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Programme Elective
5	Course Objective	The objective of this course is to provide a foundation of technologies and technical skills in web development. Based upon the development of a web, this course provides an insight of computer and networking technologies, and hands on experience in web programming.
6	Course Outcomes	CO1: Define the basic concept of HTML CO2: Illustrate the basics of PHP CO3:Develop interactive web pages using HTML5 and CSS3 CO4:Design web pages/site having validation on user data access. CO5:Compare relationship of HTML,Javascript and PHP CO6:Develop web site for business and organization or for individual
7	Course Description	The purpose of this course is to give students the basic understanding of Web pages and technologies to be used for designing web sites.
8	Outline syllabus	
	Unit 1	**HTML & HTML 5**
	A	HTML basic tags, various links implementation, image ,image map, table formatting, Lists, form design.
	B	Page layout design using frame, div and span tag, iframe
	C	HTML5: New elements, canvas, offline webpage, HTML Media: video, audio
	Unit 2	**CSS &CSS3**
	A	Introduction, syntax, selector: class and id, text formatting, margin, align, pseudo-class, pseudo-element
	B	Positioning, background formatting, Navigation bar, and image gallery.
	C	CSS3: Introduction, colors, text formatting, fonts formatting, Background formatting, 2D transform, animation
	Unit 3	**Java script**
	A	Introduction, syntax, comment, statement, variable, operators
	B	Conditional statements, looping statements, Functions
	C	Object, events, Accessing form elements, validating form elements,popup windows.

	Unit 4	**PHP Basics**		
	A	Introduction to PHP, syntax, variables, operators		
	B	Conditional statement, iterative statements, Functions		
	C	Array: single, multi dimensional, numeric array, associative array		
	Unit 5	**File Handling in PHP**		
	A	File Operation: Reading & writing data on web page from file, deleting file, renaming file		
	B	Session Management: introduction, creation, destroying and login session management		
	C	PHP Database Connectivity, Retrieving records, retrieving fields from record		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	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		

School: SSET		**Batch: 2023-2027**		
Programme:		**B.Tech.**		
Branch: ENC		**Semester: VI**		
1	Course Code	CSP024		
2	Course Title	Web Technologies Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Programme Elective		
5	Course Objective	Provide the knowledge to design and develop web application .Students will gain the skills and project-based experience needed for entry into web application and development careers		
6	Course Outcomes	CO1:Select essential skills to create simple, original web pages CO2:Demonstrate interactive web pages using CSS and Javascript CO3:Develop web pages/site having validation on user data access. CO4: Examine well-formed XML Document and XML technology CO5: Evaluate Dynamic web site using HTML,Javascript and PHP CO6:Develop web site for small business and organization or for individual		
7	Course Description	This course is an overview of the modern technologies used for the Web development.		
8				
	Unit 1	**HTML & HTML 5**		
		Programme related to HTML and HTML5 new elements		
	Unit 2	**CSS &CSS3**		
		Programme related to CSS and CSS3		
	Unit 3	**Java script & Jquery**		
		Programme related to form validation using javascript and Jquery effect		
	Unit 4	**PHP**		
		Programme related to File handling, session management, PHP-ODBC connectivity.		
	Unit 5	**XML**		
		Programme related to XML schema ,XSLT,DTD		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	4. Ivan Bayross,"HTML,DHTML, JavaScript, Perl & CGI", BPB Publication 5. Schildt H, "The Complete Reference JAVA2", TMH 6. Schildt H, "The Complete Reference J2EE", TMH		
	Other References	2. Rick Delorme," Programming in HTML5 with JavaScript and CSS3", Microsoft		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VII**
1	Course code	**CSE073**
2	Course title	**3D printing and software tools**
3	Credits	2
4	Contact hours (L-T-P)	2-0-0
	Course status	Programme Elective
5	Course objective	This course will help understand the technical principles and workflows of polymers, metals, and composites.
6	Course outcomes	Co1: apply the unique advantages of 3d printing to their designs. Co2: compare additive manufacturing to traditional technologies and choose the best technology for a given application. Co3: distinguish between various 3d printing technologies and materials and select appropriately for a given application. Co4: discuss the economic implications of 3d printing including its impact on startup businesses and supply chains Co5: evaluate real-life scenarios and recommend the appropriate use of 3d printing technology Co6: explain current and emerging 3d printing applications in a variety of industries
7	Course description	In this course students will gain broad understanding of the advances that led to today's manufacturing environment. They will understand how humans, machines and code work together to make things.
8	Outline syllabus	
	Unit 1	Introduction to 3d printing
	A	Cutting, subtractive manufacturing
	B	Forming
	C	Additive manufacturing
	Unit 2	Mesh
	A	Review of geometry terms
	B	Things to consider when preparing a mesh file
	C	Making process (a reminder), making by sharing
	Unit 3	Introduction to computer numerical control (cnc)

	A	Numerical control, functions of a machine tool, concept of numerical control, historical development, definition		
	B	Advantages of cnc machine tools, evolution of cnc, advantages of cnc, limitations of cnc, features of cnc		
	C	The machine control unit (mcu) for cnc, classification of cnc machine tools, cnc machining centers		
	Unit 4	Blue print reading		
	A	Reading the machining sketches, different geometrical tolerance symbols,		
	B	Reading dimensional tolerances, understanding the views,		
	C	Concept of first angle & third angle projection		
	Unit 5	Cnc milling		
	A	Fundamentals of cnc milling, familiarization of control panel		
	B	Fundamentals of cnc programming, part programming techniques		
	C	Machining practice on cnc milling, practice session at industry		
	Mode of examination	Theory/jury/practical/viva		
	Weightage distribution	Ca	MTE	ETE
		25%	25%	50%
	Text book/s*	Liza Wallach Kloski, Nick Kloski – "Getting Started with 3D Printing_ A Hands-on Guide to the Hardware, Software, and Services Behind the New Manufacturing Revolution"-Maker Media, Inc (2016)		
	Other references	NA		

School: SSET		**Batch: 2023-2027**
Programme:		**B.Tech.**
Branch: ENC		**Semester: VII**
1	Course Code	CSE071
2	Course Title	Introduction to Internet of Things
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Programme Elective
5	Course Objective	In this course, student will explore various concepts of Internet of things such as things, enabling technologies, M2M to IoT and IoT architecture. This course also discusses the security challenges and then provides answers on how to successfully manage IoT security and build a safe infrastructure for smart devices. In the end they will also be able to identify the challenges in IoT and its various areas of application.
6	Course Outcomes	CO1: Define the general concepts of Internet of Things. CO2: Recognize the basic M2M Ecosystem and change from M2M to IoT. CO3: Outline the concepts of IoT platform. CO4: Explain IoT security and vulnerability threats. CO5: Examine the challenges in IoT specific application. CO6: Discuss the various domains where IOT can be applied successfully.
7	Course Description	This course introduces the concepts for internet of things and how we can embed it into our daily lives for the development of life style. It will also help students to understand the applications according to their problem statements.
8	Outline syllabus	
	Unit 1	**Introduction to IoT**
	A	Defining IoT, History of IoT, Importance of IoT , IoT Basic Characteristics, Enabling Technologies of IoT
	B	About the Internet in IoT, IoT Advantages and Disadvantages, M2M Overview, M2M Features
	C	M2M Ecosystem, Comparison of the Main Characteristics of M2M and IoT, M2M Applications
	Unit 2	**IoT Architecture**
	A	Basic Building blocks of IoT system: Sensors, Processors, gateways, Applications
	B	Physical design of IoT: Things in IOT, IoT Protocols, Logical design of IoT: IoT Functional Blocks, IoT Communication Models. IoT Communication API's
	C	IoT Service Oriented Architecture (SOA), API Oriented Architecture.
	Unit 3	**Introduction to IoT Platform**

	A	IoT Working, Introduction to Arduino and Raspberry Pi
	B	The SENSEnut Platform, Peripheral Hardware Specific Calls: DIO Functions, I^2C Functions
	C	MAC functions: General Functions, Coordinator Functions, genMac

		Functions		
	Unit 4	**Vulnerabilities, Attacks, and Countermeasures**		
	A	Cyber security versus IoT security and cyber-physical systems, Need to secure IoT		
	B	Primer on threats, vulnerability, and risks (TVR)		
	C	Common IoT attacks, Today's IoT attacks , Threat modeling for an IoT system		
	Unit 5	**Domain specific applications of IoT**		
	A	Home automation concept and case study		
	B	Industry applications concept and case study		
	C	Surveillance applications concept and case study, Other IoT applications		
	Mode of examination	Theory/Jury/Practical/Viva		
	Weightage Distribution	CA	MTE	ETE
		25%	25%	50%
	Text book/s*	1. The Internet of Things: Connecting Objects to the Web edited by HakimaChaouchi, Reference for Unit-1. 2. Introduction to Internet of Things, Prof. Sudip Misra, NPTEL Lectures Notes, Department of Computer Science and Engineering, Indian Institute of Technology Kharagpur, Reference for Unit 2, 3 (c), 4. 3. Internet of Things, Rajkumar Buyya, Reference for Unit 3 (c) 4. ArshdeepBahga and Vijay Madisetti, “Internet of Things – A Hand-on Approach”, Universities press, 2015, Reference for Unit 3 (B) 5. API REFERENCE GUIDE: SENSEnuts WSN sensation 6. Practical Internet of Things Security, Brian Russell, Drew Van DurenCopyright © 2016 Packt Publishing		
	Other References	1. CharalamposDoukas , "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		

School: SSET		**Batch: 2023-2027**	
Programme:		**B.Tech.**	
Branch: ENC		**Semester: VII**	
1	Course Code	ECE063	
2	Course Title	Artificial Intelligence for IoT	
3	Credits	3	
4	Contact Hours (L-T-P)	2-0-2	
	Course Status	Programme Elective	
5	Course Objective	The aim of this course is to cover various aspects of artificial intelligence (AI) and its implementation to make IoT solutions smarter.	
6	Course Outcomes	The students will be able to: CO1: Apply the principles and foundations of IoT and AI CO2: Demonstrate different ML paradigms for IoT based applications. CO3: Construct IoT based applications with Naïve Bayes, Decision tree and ensemble learning. CO4: Improving the model using various techniques. CO5: Implementing AI from case study of Smart Cities CO6: Apply different AI techniques including machine learning using TensorFlow and Keras	
7	Course Description	This course describes basic understanding of machine learning concepts. This course also involves the AI and ML techniques to develop smart systems for IoT.	
8	Outline syllabus		CO Mapping
	Unit 1	**Principles and Foundations of IoT and AI**	
	A	IoT Reference Model, IoT platforms, IoT verticals	CO1
	B	Big data and IoT, Infusion of AI- data science in IoT	CO1
	C	Cross-industry standard process for data mining, AI platforms and IoT platforms	CO1
	Unit 2	**Machine Learning for IoT-I**	
	A	ML and IoT, Learning paradigms, Prediction using linear regression	CO2, CO6
	B	Logistic regression for classification: Cross-entropy loss function	CO2, CO6
	C	Classification using support vector machines, Maximum margin hyperplane, Kernel trick	CO2, CO6
	Unit 3	**Machine Learning for IoT-II**	
	A	Naive Bayes	CO3, CO6
	B	Decision trees: Decision trees in scikit, Decision trees in action	CO3, CO6
	C	Ensemble learning: Voting classifier, Bagging and pasting	CO3, CO6
	Unit 4	**Improving the model**	
	A	Feature scaling to resolve uneven data scale	CO4, CO6
	B	Overfitting: Regularization, Cross-validation	CO4, CO6
	C	No Free Lunch theorem	CO4, CO6
	Unit 5	**AI for Smart Cities IoT**	
	A	Need of smart cities, Components of a smart city	CO5, CO6

	B	Smart traffic management, Smart parking, Smart waste management			CO5, CO6
	C	Smart policing, Smart lighting, Smart governance			CO5, CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Hands-On Artificial Intelligence for IoT, Amita Kapoor, Publisher: Packet Publishing			