MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

B TECH ELECTRONICS & COMMUNICATION ENGINEERING

R22- COURSE STRUCTURE

I YEAR – I SEMESTER

S.No	Subject Code	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R22A0001	English	2	0	0	2	40	60
2	R22A0023	Mathematics–I	3	1	0	4	40	60
3	R22A0021	Applied Physics	3	1	0	4	40	60
4	R22A0022	Engineering Chemistry	3	0	0	3	40	60
5	R22A0501	Programming for Problem Solving	3	0	0	3	40	60
6	R22A0082	Applied Physics/Engineering Chemistry Lab	-	0	3	1.5	40	60
7	R22A0083	Engineering and Computing Hardware Workshop	-	0	2	1	40	60
8	R22A0581	Programming for Problem Solving Lab	-	0	3	1.5	40	60
9	R22A0003	Human Values and Professional Ethics	2	0	0	0	40	60
		Total	**16**	**2**	**8**	**20**	**360**	**540**

I YEAR – II SEMESTER

S.No	Subject Code	SUBJECT	L	T	P	C	MAX.MARKS	
							INT	EXT
1	R22A0002	Professional English	2	0	0	2	40	60
2	R22A0024	Mathematics–II	3	1	0	4	40	60
3	R22A0201	Principles of Electrical and Electronics Engineering	3	0	0	3	40	60
4	R22A0301	Computer Aided Engineering Graphics	2	0	3	4	40	60
5	R22A0502	Problem Solving using Python Programming	3	0	0	3	40	60
6	R22A0081	English Language and Communication Skills Lab	-	0	2	1	40	60
7	R22A0281	Principles of Electrical and Electronics Engineering Lab	-	0	3	1.5	40	60
8	R22A0582	Problem Solving using Python Programming Lab	-	0	3	1.5	40	60
9	R22A0004	Environmental Science	2	0	0	0	40	60
		Total	**15**	**1**	**11**	**20**	**360**	**540**

II YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0401	Analog Circuits	3	1	0	4	40	60
2	R22A0261	Network analysis and Synthesis	3	0	0	3	40	60
3	R22A0402	Digital Logic Design	3	0	0	3	40	60
4	R22A0403	Signals and Systems	3	1	0	4	40	60
5	R22A0404	Probability Theory and Stochastic Processes	3	0	0	3	40	60
6	R22A0481	Analog Circuits Laboratory	0	0	2	1	40	60
7	R22A0482	Digital logic Design Laboratory	0	0	2	1	40	60
8	R22A0483	Basic Simulation Laboratory	0	0	2	1	40	60
9	R22A0008 R22A0005	Constitution of India/ Foreign Language: French	3	0	0	0	100	-
		Total	**18**	**2**	**6**	**20**	**420**	**480**

II YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0025	Numerical Methods and Complex Variables	3	0	0	3	40	60
2	R22A0405	Electromagnetic Fields and Transmission Lines	3	0	0	3	40	60
3	R22A0406	Analog and Digital Communications	3	0	0	3	40	60
4	R22A0407	Linear and Digital IC Applications	3	0	0	3	40	60
5	R22A0408	Electronic Circuit Analysis	3	0	0	3	40	60
6	R22A0484	Analog and Digital Communications Laboratory	0	0	2	1	40	60
7	R22A0485	Linear and Digital IC Applications Laboratory	0	0	2	1	40	60
8	R22A0486	Electronic Circuit Analysis Laboratory	0	0	2	1	40	60
9	R22A0487	Real Time Project/Field Based Project	0	0	4	2	100	-
10	R22A0XXX R22A0061	Gender Sensitization Lab/ Public policy & e Governance	0	0	2	0	-	-
		Total	**15**	**0**	**12**	**20**	**420**	**480**

III YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0409	Microprocessors & Microcontrollers	3	1	0	4	40	60
2	R22A0XXX	Artificial Intelligence & Machine Learning	3	0	0	3	40	60
3	R22A0210	Control Systems	3	0	0	3	40	60
4	OE-I	**Open Elective –I**	3	0	0	3	40	60
5	PE-I	**Professional Elective–I**	3	0	0	3	40	60
6	R22A0488	Microprocessors & Microcontrollers Laboratory	0	0	2	1	40	60
7	R22A0xxxx	Artificial Intelligence & Machine Learning Laboratory	0	0	2	1	40	60
8	R22A0489	Application Development-I	0	0	4	2	40	60
		Total	15	1	8	20	320	480

Professional Elective –I

R22A0410	Computer Organization & Operating Systems
R22A0411	Data Communications and Computer Networks
R22A0412	Digital Design through Verilog HDL

III YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0413	Antennas and Wave Propagation	3	1	0	4	40	60
2	R22A0414	Digital Signal Processing	3	0	0	3	40	60
3	R22A0415	VLSI Design	3	0	0	3	40	60
4	OE-II	**Open Elective –II**	3	0	0	3	40	60
5	PE-II	**Professional Elective-II**	3	0	0	3	40	60
6	R22A0490	Digital Signal Processing Laboratory	0	0	2	1	40	60
7	R22A0491	VLSI Design Laboratory	0	0	2	1	40	60
8	R22A0492	Application Development-II	0	0	4	2	40	60
		Total	15	1	8	20	320	480

Professional Elective–II

R22A0416	Digital Image Processing
R22A0417	Mobile Communications and Networks
R22A0xxxx	Fundamentals of Cyber Security

IV YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A0418	Microwave and Optical Communications	3	1	0	4	40	60
2	PE-III	**Professional Elective–III**	3	0	0	3	40	60
3	PE-IV	**Professional Elective–IV**	3	0	0	3	40	60
4	OE-II	**Open Elective–II**	3	0	0	3	40	60
5	R22A0XXX	Professional Practice, Law& Ethics	3	0	0	2	40	60
6	R22A0494	Microwave and Optical Communications Laboratory	0	0	4	2	40	60
7	R22A0495	**Project Stage–I**	0	0	6	3	40	60
		Total	**15**	**1**	**10**	**20**	**280**	**420**

Professional Elective –III

R22A0419	Radar Systems
R22A0420	CMOS Analog IC Design
R22A05xx	Artificial Neural Networks

Professional Elective–IV

R22A0421	Network Security and Cryptography
R22A0422	Satellite Communications
R22A0423	Biomedical Instrumentation

IV YEAR II SEMESTER

S.No.	Course Code	Course Title	L	T	P	C	MAX. MARKS	
							INT	EXT
1	R22A03XX	Innovation, Start-Up & Entrepreneurship	4	0	0	4	40	60
2	PE-V	Professional Elective– V	3	0	0	3	40	60
3	PE-VI	Professional Elective–VI	3	0	0	3	40	60
4	R22A0496	Project Stage–II including Seminar	0	0	20	10	80	120
		Total	**10**	**0**	**20**	**20**	**200**	**300**

Professional Elective–V

R22A0424	Electronic Measurements & Instruments
R22A0425	5G and beyond Communication
R22A0426	Embedded System Design

Professional Elective–VI

R22A05xx	Multimedia Database Management Systems
R22A0427	System on Chip Architecture
R22A0428	Wireless sensor Networks

Open Electives

Open Elective-I		
1	R22A0551	Java Programming
2	R22A1251	Web Development
3	R22A2151	Intellectual Property Rights
4	R22A0351	Robotics & Automation
5	R22A0451	Electronics for Health Care
6	R22A0251	Renewable Energy Sources
7	R22A06751	Principles of Data Science
8	R22A06752	Business Analytics

Open Elective-II		
1	R22A066XX	Database Systems
2	R22A0675	Big Data Architecture
3	R22A0352	Design Thinking
4	R22A0552	Principles of Cloud Computing
5	R22A6951	Internet of Things & its Applications
6	R22A2152	Nano Technology
7	R22A0252	Electrical and Hybrid Vehicles
8	R22A6251	Cyber Governance

B. TECH SYLLABUS

II YEAR- I SEMESTER

R22-REGULATION

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R22A0401) ANALOG CIRCUITS

Course Objectives:

1. Learn the concepts of, load line analysis and biasing techniques
2. Learn the concepts of high frequency analysis of transistors.
3. To give understanding of various types of amplifier circuits
4. Learn the concepts of small signal analysis of BJT and FET
5. To familiarize the Concept of feedback in amplifiers so as to differentiate betweennegative and positive feedback.

UNIT – I

BJT Biasing: Transistor Biasing and Stabilization - Operating point, Need for biasing, DC Load line, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diode.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Transistor Hybrid model, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_i, R_i , A_v,and R_o.

UNIT –II

BJT Amplifiers-Frequency Response: Frequency response of an amplifier, Analysis at low and High Frequencies, Hybrid-pi (π) common emitter transistor model, Calculation of hybrid- π model parameters, Millers theorem and its dual.

Multistage Amplifiers: Distortion in amplifiers, Analysis of cascaded BJT amplifier, Darlington pair, coupling schemes-RC coupled amplifier, Transformer coupled amplifier, and Direct coupled Amplifier.

UNIT – III

FET-Biasing and FET Amplifiers: FET biasing: fixed bias and self bias. FET Amplifiers: Analysis of Common source (C.S), Common Drain (C.D) JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOSFET Amplifiers.

UNIT –IV

FEEDBACK AMPLIFIERS: Concept of Feedback and types, Effects of negative feedback on amplifiers characteristics, voltage series, current series, current shunt, and voltage shunt feedback amplifiers**.**

UNIT –V

OSCILLATORS: Classification of oscillators, Barkhausen criterion, RC phase Shift oscillator, Wien-bridge oscillator, LC oscillators- Hartley and Colpitts oscillator.

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias -Integrated Electronics, McGraw Hill Education.
2. Robert L. Boylestead, Louis Nashelsky -Electronic Devices and Circuits theory, 11th Edition,2009, Pearson

REFERENCE BOOKS:

1. David A. Bell – Electronic Devices and Circuits, 5th Edition, Oxford.
2. Adel S. Sedra, Kenneth C. Smith- Microelectronic Circuits- Theory and Applications, Oxford.
3. Chinmoy Saha, Arindam Halder, Debaati Ganguly -Basic Electronics-Principles andApplications, 2018, Cambridge.

Course Outcomes:

Upon completing this course, the students will be able to

1. Design the amplifiers with various biasing techniques.
2. Design single stage amplifiers using BJT and FET
3. Design multistage amplifiers and understand the concepts of High Frequency Analysis of BJT.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positivefeedback to sustained oscillations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R22A0261) NETWORK ANALYSIS AND SYNTHESIS

COURSEOBJECTIVES:

1. To solve the two port network parameters.
2. To recognize the behavior of R, L, C with DC excitation.
3. Concept of Series , parallel resonance and current locus diagrams
4. To know the pole zero location for driving point and transfer functions
5. To describe Foster and Cauer forms and the properties of immittance functions.

UNIT–I: TWO PORT NETWORKS:

Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one parameter to another parameter, Conditions for Reciprocity and symmetry, Illustrative problems.

UNIT–II: D.C.TRANSIENT ANALYSIS (FIRST & SECOND ORDER CIRCUITS):

Introduction to transient response and steady state response, Transient response of series – RL,RC, RLC Circuits for D.C excitation with Initial Conditions, Solutions using Differential Equations approach and Laplace Transform approach ,Illustrative problems.

UNIT-III: LOCUS DIAGRAMS & RESONANCE:

Locus diagrams: Locus diagrams of Series RL, RC circuits with variation of various parameters, parallel RL, RC circuits with variation of various parameters.

Resonance: Resonance-Series and Parallel circuits, Concept of Bandwidth and Quality factor.

UNIT–IV: NETWORK FUNCTIONS: Review of Network functions for one port and two port networks: – pole zero location for driving point and transfer functions-Impulse response of Network functions from pole-zero plots.

UNIT-V: SYNTHESIS OF ONE PORT NETWORKS

Synthesis of reactive one-ports by Foster's and Cauer methods (forms I and II) -Synthesis of LC, RC and RL driving-point functions.

Text Books:

1. K. S. Suresh Kumar, —Electric Circuit Analysis‖, Pearson Publications, 2013.
2. 2. Ravish R. Singh, "Network Analysis and Synthesis", McGraw-Hill Education, 2013

References:

1. Franklin Kuo, —Network Analysis and Synthesis‖, 2nd Ed.,Wiley India.
2. Van Valkenburg M.E., —Introduction to Modern Network Synthesis,‖ Wiley Eastern, 1960 (reprint 1986).
3. Van Valkenburg M.E, —Network Analysis,‖ Prentice Hall India, 2014.
4. Charles A. Desoer and Ernest S. Kuh, —Basic Circuit Theory,‖ Tata McGraw Hill Edition.
5. Chakrabarti, A., "Circuit Theory Analysis and Synthesis", Dhanpat Rai& Co., Seventh - Revised edition, 2018
6. S. K. Bhattacharya, —Network Analysis and Synthesis,‖ Pearson Education India.

COURSE OUTCOMES:

- Able to solve two port network parameters
- Able to analyze the transient and steady state analysis of RLC Circuits.
- Accomplish the computation of Quality factor, band width and current locus diagram for a given electrical circuit.
- Identify the properties and characteristics of network functions.
- Synthesize passive one-port networks using standard Foster and Cauer forms.

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R22A0402) DIGITAL LOGIC DESIGN

COURSE OBJECTIVES:

1. To understand common forms of number representation in digital electronic circuits andto be able to convert between different representations.
2. To implement simple logical operations using combinational logic circuits
3. To design combinational logic circuits, sequential logic circuits.
4. To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems.
5. Understanding of the different technologies related to HDLs, construct, compile and execute Verilog HDL programs using provided.
6. Designing digital circuits, behavior and RTL modeling of digital circuits using Verilog HDL.

UNIT –I:

Number Systems, Boolean Algebra and Switching Functions:
Number Systems, Base Conversion Methods, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code, Unit Distance Codes, Error Detecting and Error Correcting Codes, Hamming Code.

Boolean Algebra:
Basic Theorems and Properties, Switching Functions, Canonical and Standard Forms, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Logic Gates.

UNIT –II

Minimization and Design of Combinational Circuits:
K- Map Method, up to Five variable K- Maps, Don't Care Map Entries, Combinational Design, Arithmetic Circuits, Comparator, decoder, Encoder, Multiplexers, De-Multiplexers, Code Converters.

UNIT –III:

Sequential Machines Fundamentals:
Introduction, Basic Architectural Distinctions between Combinational and Sequential circuits, classification of sequential circuits, The binary cell, The S-R-Latch Flip-Flop The D-Latch Flip-Flop,The "Clocked T" Flip-Flop, The " Clocked J-K" Flip-Flop, Conversion from one type of Flip-Flop to another.

UNIT –IV:

INTRODUCTION TO VERILOG HDL: Verilog as HDL, Levels of Design Description, Concurrency,Simulation and Synthesis, Programming Language Interface, Module.
Language Constructs and Conventions: Introduction, Keywords, Identifiers, White Space, Characters, Comments, Numbers, Strings, Logic Values, Data Types, Operators.

UNIT –V:

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Design of Flip- Flops with Gate Primitives, Delay.
MODELING AT DATAFLOW LEVEL: Introduction, Continuous Assignment Structure, Delays and Continuous Assignments.
BEHAVIORAL MODELING: Introduction, Operations and Assignments, 'Initial' Construct, 'always' construct, , Design at Behavioral Level, The 'Case' Statement, 'If' and 'if-Else' Constructs

TEXT BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Switching Theory and Logic Design-A. Anand Kumar, PHI, 2nd Edition.
3. T.R. Padmanabhan, B Bala Tripura Sundari, Design through Verilog HDL, Wiley 2009.
4. Verilog HDL - Samir Palnitkar, 2nd Edition, Pearson Education, 2009.
5.

REFERENCE BOOKS:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rdEd,John Wiley & Sons Inc.
2. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
3. Switching Theory and Logic Design – Bhanu Bhaskara –Tata McGraw Hill Publication, 2012
4. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
5. Fundamentals of Digital Logic with Verilog Design - Stephen Brown,Zvonkoc Vranesic, TMH, 2nd Edition.
6. Advanced Digital Design with Verilog HDL - Michel D. Ciletti, PHI, 2009.

COURSE OUTCOMES:

Upon completion of the course, student should possess the following skills:

1. Be able to manipulate numeric information in different forms
2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
3. Be able to design and analyze small combinational circuits and to use standard combinational functions to build larger more complex circuits.
4. Be able to design and analyze Digital circuits
5. Verify behavior and Implement RTL models on FPGAs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

(R22A0403) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The main objectives of the course are:

1) Knowledge of time-domain representation and analysis concepts of basic elementary signals
2) Knowledge of Fourier Series for Continuous Time Signals
3) Knowledge of frequency-domain representation and analysis concepts F.T., L.T. & Z.T and Concepts of the sampling process.
4) Mathematical and computational skills needed to understand the principal of Linear System and Filter Characteristics of a System.
5) Mathematical and computational skills needed to understand the concepts of auto correlation and cross correlation and power Density Spectrum.

UNIT I:

INTRODUCTION TO SIGNALS: Elementary Signals- Continuous Time (CT) signals, Discrete Time (DT) signals, Classification of Signals, Basic Operations on signals.

FOURIER SERIES: Representation of Fourier series, Continuous time periodic signals, Dirichlet's conditions, Trigonometric Fourier Series, Exponential Fourier Series, Properties of Fourier series, Complex Fourier spectrum.

UNIT II:

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Properties of Fourier transforms.

SAMPLING: Sampling theorem **–** Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing.

UNIT III:

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS: Introduction to Systems, Classification of Systems, Linear Time Invariant (LTI) systems, impulse response, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, System bandwidth, Ideal LPF, HPF and BPF characteristics.

UNIT IV:

CONVOLUTION AND CORRELATION OF SIGNALS: Concept of convolution in time domain, Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between convolution and correlation.

UNIT V:

LAPLACE TRANSFORMS: Review of Laplace transforms, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, Properties of L.T's relation between L.T's, and F.T. of a signal.

Z–TRANSFORMS: Concept of Z- Transform of a discrete sequence. Distinction between Laplace,

Fourier and Z transforms, Region of convergence in Z-Transform, Inverse Z- Transform, Properties of Z-transforms.

TEXT BOOKS:

1) "Signals & Systems", Special Edition – MRCET, McGraw Hill Publications, 2017
2) Signals, Systems & Communications – B.P. Lathi, BS Publications, 2003.
3) Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.
4) Signals and Systems – A. Anand Kumar, PHI Publications, 3rd edition.

REFERENCE BOOKS:

1) Signals & Systems – Simon Haykin and Van Veen,Wiley, 2nd Edition.
2) Network Analysis – M.E. Van Valkenburg, PHI Publications, 3rd Edn.,2000.
3) Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition,2008.
4) Signals, Systems and Transforms – C. L. Philips, J. M. Parr and Eve A. Riskin, Pearson education.3rd Edition, 2004.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

1) Understand the basic elementary signals
2) Determine the Fourier Series for Continuous Time Signals
3) Analyze the signals using F.T, L.T & Z.T and study the properties of F.T., L.T. & Z.T.
4) Understand the principal of Linear System and Filter Characteristics of a System.
5) Understand the concepts of auto correlation and cross correlation and power Density Spectrum.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
3/-/-/3

(R22A0404) PROBABILITY THEORY AND STOCHASTIC PROCESSES

COURSE OBJECTIVES:

1) To expose the students to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) To understand the basic concepts of probability, single and multiple random variables and to introduce some standard distributions applicable to engineering which can describe real life phenomenon
3) To understand the basic concepts of random processes.
4) To understand the concept of correlation and spectral densities.
5) To understand the significance of linear systems with random inputs.

UNIT I:

PROBABILITY AND RANDOM VARIABLE

Probability: Set theory, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, and Independent Events, Bernoulli's trials.

The Random Variable: Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous.

UNIT II:

DISTRIBUTION AND DENSITY FUNCTIONS AND OPERATIONS ON ONE RANDOM VARIABLE

Distribution and density functions: Distribution and Density functions, Properties, Binomial, Uniform, Exponential, Gaussian and Conditional Distribution and Conditional Density function and its properties, problems.

Operation on One Random Variable: Expected value of a random variable, function of a random variable, moments about the origin, central moments, variance, characteristic function, moment generating function.

UNIT III:

MULTIPLE RANDOM VARIABLES AND OPERATIONS ON MULTIPLE RANDOM VARIABLES

Multiple Random Variables: Joint Distribution Function and Properties, Joint density Function and Properties, Marginal Distribution and density Functions, conditional Distribution and density Functions, Statistical Independence.

Operations on Multiple Random Variables: Expected Value of a Function of Random Variables, Joint Moments about the Origin, Joint Central Moments.

UNIT IV:

Random Processes-Temporal Characteristics: The Random process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Statistical Independence and concept of Stationarity: First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth-Order and Strict-Sense Stationarity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions and its properties.

Linear system Response: Mean and Mean-squared value, Autocorrelation, Cross-Correlation Functions.

UNIT V:

Random Processes-Spectral Characteristics: The Power Spectrum and its Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum and Properties, Relationship between Cross-Power Spectrum and Cross- Correlation Function.

Spectral characteristics of system response: Power Density Spectrum of response of linear system, Cross Power Spectral Density of input and output of a Linear System.

TEXT BOOKS:

1) Probability, Random Variables & Random Signal Principles -Peyton Z. Peebles, TMH, 4th Edition, 2001.
2) Probability and Random Processes-Scott Miller, Donald Childers,2Ed,Elsevier,2012

REFERENCE BOOKS:

1) Theory of probability and Stochastic Processes-Pradip Kumar Gosh, University Press
2) Probability and Random Processes with Application to Signal Processing - Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3) Probability Methods of Signal and System Analysis- George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4) Statistical Theory of Communication -S.P. Eugene Xavier, New Age Publications 2003
5) Probability, Random Variables and Stochastic Processes Athanasios Papoulis and S.Unnikrishna Pillai, PHI, 4th Edition, 2002.

COURSE OUTCOMES

1) Exposed to the basics of probability theory and random processes essential for their subsequent study of analog and digital communication.
2) Understand the axiomatic formulation of modern Probability Theory and think of random variables as an intrinsic need for the analysis of random phenomena.
3) Characterize probability models and function of random variables based on single & multiples random variables.
4) Evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits.
5) Understand the concept of random processes and determine covariance and spectral density of stationary random processes.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**

-/-/2/1

(R22A0481) ANALOG CIRCUITS LAB

COURSE OBJECTIVES:

1) To design Multistage, Power amplifiers and multivibrators according to given specifications.

2) To analyze various amplifiers such as Common Emitter, Common Source, Cascade and Cascode amplifiers.

3) To build circuit construction skills using circuit simulation software tool.

4) To simulate different amplifier circuits.

5) To design Feedback amplifiers

CYCLE-I: Design and Simulation in Simulation Laboratory using any Simulation Software. (Minimum eight experiments)

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Two stage RC-Coupled amplifier
4. Current Shunt Voltage Feedback amplifier
5. Cascade Amplifier
6. Class A Power Amplifier
7. Switching Characteristics of a Transistor
8. Design a Bistable Multivibrator and draw its waveforms
9. Design a Astable Multivibrator and draw its waveforms
10. Design a Monostable Multivibrator and draw its waveforms

CYCLE-II: Components Testing in the Hardware Laboratory (Minimum 8 Experiments):

1. P-N Junction Diode and Zener Diode V-I Characteristics
2. Half -Wave Rectifier and Full Wave Rectifier With And Without Filter
3. Input And Output Characteristics Of Transistor C.E Configuration
4. FET Characteristics
5. Common Emitter Amplifier.
6. Two Stage RC Coupled Amplifier
7. Class A Power Amplifier
8. Class C Power Amplifier
9. Design a Bistable Multivibrator and draw its waveforms
10. Design a Astable Multivibrator and draw its waveforms
11. Design of Schmitt Trigger
12. Logic Gates

COURSE OUTCOMES

1) Design Multistage, Power amplifiers and multivibrators according to given specifications.

2) Analyze various amplifiers such as Common Emitter, Common Source, Cascade and Cascode amplifiers.

3) Build circuit construction skills using circuit simulation software tool.

4) Simulate different amplifier circuits.

5) Design Feedback amplifiers

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**

-/-/2/1

(R22A0482) DIGITAL LOGIC DESIGN LAB

COURSE OBJECTIVES:

1) To design basic combinational logic and sequential circuits using HDL.
2) To develop familiarity and confidence with designing, building and testing digital circuits, including the use of CAD tools.

HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalent front end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 Decoder
3. Design of 8-to-3 Encoder
4. Design of Priority Encoder
5. Design of 8-to-1 Multiplexer
6. Design of 1 x 8 De-Multiplexer.
7. Design of 4-bit Binary to Gray Code Converter
8. Design of 2-bit Comparator
9. Design of Full Adder using 3 modeling styles
10. Design of Full Subtractor
11. Design of SR, JK, T & D Flip Flops

COURSE OUTCOMES:

1. Design and simulate the combinational and sequential logic circuits using hardware description languages.
2. Analyze the results of logic and timing simulations and to use these simulation results to debug digital systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**

-/-/2/1

(R22A0483) BASIC SIMULATION LAB

COURSE OBJECTIVES:

1) To learn basic Operations on Matrices.

2) To simulate generation of basic waveforms and general operations on signals.

3) To Understand the Concept of auto correlation, cross correlation and Convolution of given Signal/ sequence and simulate it accordingly.

4) To learn various transforms like Fourier and Z-transform of various signals.

NOTE:

1) All the experiments are to be simulated using MATLAB or equivalent software

2) Minimum of 10 experiments are to be completed

List of experiments:

1) Basic operations on matrices.

2) Generation of various signals and Sequences (periodic and aperiodic) such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sine.

3) Operations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.

4) Finding the even and odd parts of signal/sequence and real and imaginary part of signal.

5) Convolution between signals and sequences.

6) Auto correlation and cross correlation between signals and sequences.

7) Verification of linearity properties of a given continuous /discrete system.

8) Verification of time invariance properties of a given continuous discrete system.

9) Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying stability properties.

10) Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.

11) Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.

12) Sampling theorem verification.

COURSE OUTCOMES

After going through this course the student will be able to

1) Do the various operations on matrices.

2) Perform various operations on the signals including Time shifting, Scaling, Reversal, Amplitude Scaling.

3) Determine the correlation & Convolution between Signals and sequences.

4) Understand the various transforms of signals and sequences.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**

3/-/-/3

(R22A0XXX) CONSTITUTION OF INDIA

Course Objectives:

Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional
- role and entitlement to civil and economic rights as well as the emergence of nationhood in
- the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution
- in 1917 and its impact on the initial drafting of the Indian Constitution.
- Course Outcomes: Students will be able to:
- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the
- arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the
- conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]
- under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- Discuss the passage of the Hindu Code Bill of 1956.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.

Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features

Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj:Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- I Sem **L/T/P/C**
3/-/-/3

MANDATORY COURSE – IV
(R22A0XXX) FOREIGN LANGUAGE-FRENCH

INTRODUCTION

In view of the growing importance of foreign languages as a communication tool in some countries of the world, French has been identified as one of the most popular languages after English. As a result, French program is introduced to develop the linguistic and communicative skills of engineering students and to familiarize them to the French communication skills. This course focuses on basic oral skills.

COURSE OBJECTIVES:

1) To inculcate the basic knowledge of the French language
2) To hone the basic sentence constructions in day to day expressions for communication in their vocation
3) To form simple sentences that aids in day-to-day communication
4) To prepare the students towards DELF A1
5) To develop in the student an interest towards learning languages.

UNIT - I:

Speaking: Introduction to the French language and culture –Salutations - French alphabet - Introducing people
Writing: Understand and fill out a form
Grammar:The verbs “to be ' and “to have '' in the present tense of theindicative
Vocabulary: The numbers from 1 to 20 - Professions- Nationalities

UNIT - II:

Speaking: Talk about one’s family – description of a person - express his tastes and preferences - express possession - express negation
Writing: Write and understand a short message
Grammar: Nouns (gender and number) - Articles - The–erverbs in the present- Possessive adjectives - Qualifying adjectives
Vocabulary: The family – Clothes-Colors- The numbers from 1 to 100-The classroom

UNIT - III

Speaking: Talk about your daily activities - be in time - ask and indicate the date and time - talk about sports and recreation - express the frequency
Writing:A letter to a friend
Grammar: The expression of time– The –ir verbs in the present- The verbs do, go, take, come,- Adverbs-Reflexive verbs
Vocabulary: The days and months of the year-The sports-Hobbies

UNIT - IV

Speaking:Express the quantity - ask and give the price - express the need, the will and the capacity - compare (adjective) - speak at the restaurant / in the shops

Writing:A dialogue between a vendor and a customer at the market

Grammar: Verbs “to want”, “to can”- Express capacity / possibility- Express will / desire – the future tense

Vocabulary:The food – Meals-Fruits and vegetables– The parts of the body

UNIT - V

Speaking: Express the prohibition and the obligation - describe an apartment - talk about the weather / ask the weather - ask the opinion - give your opinion - express your agreement or disagreement

Writing: Descriptions

Grammar: Demonstrative adjectives-Prepositions-The verb 'must 'to indicate obligation and necessity in the present

Vocabulary: Seasons – Holidays-The city– Furniture

NOTE: The students are exposed to simple listening and reading activities.

REFERENCE BOOKS

1) Apprenons le Français 1& 2, New Saraswati House, 2015
2) A propos, A1, Langers International, 2010
3) Easy French Step-by-step by Myrna Bell Rochester
4) Ultimate French Beginner-Intermediate (Coursebook) By Livid Language
5) Ã L'Aventure: An Introduction to French Language and Francophone Cultures by Evelyne Charvier-Berman, Anne C. Cummings.

COURSE OUTCOMES

1) The students will be able to communicate in French at A1 level.
2) The student will have an advantage in the competitive job market.
3) This course benefits the graduates when pursuing study *opportunities* in the countries where French is the official language.

B.TECH II YEAR
II SEMESTER SYLLABUS

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
3/-/-/3

(R22A0xxx) NUMERICAL METHODS AND COMPLEX VARIABLES

COURSE OBJECTIVES:

1) The expansion of a given function by Fourier series.
2) The Fourier sine and cosine transforms, properties, inverse transforms, and finite Fourier transforms.
3) Differentiation and integration of complex valued functions. Evaluation of integrals using Cauchy's integral formula.
4) Taylor's series, and Laurent's series expansions of complex functions, evaluation of integrals using residue theorem.
5) Transform a given function from z - plane to w – plane. Identify the transformations like translation, magnification-rotation, reflection-inversion, and Properties of bilinear transformations.

UNIT – I:

Fourier series: Definition of periodic function, Fourier expansion of periodic functions in a given interval of length 2. Determination of Fourier coefficients – Fourier series of even and odd functions – Half-range Fourier sine and cosine Expansions-Fourier series in an arbitrary interval.

UNIT – II:

Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals, Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Analytic functions: Complex functions and its representation on Argand plane, Concepts of limit, continuity, differentiability, Analyticity, and Cauchy-Riemann conditions, Harmonic functions – Milne – Thompson method. Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem (singly and multiply connected regions) – Cauchy's integral formula – Generalized integral formula.

UNIT – IV:

Singularities and Residues: Radius of convergence – Expansion in Taylor's series, Laurent's series. Singular point – Isolated singular point – pole of order m – essential singularity. Residue – Evaluation of residue by formula and by Laurent series – Residue theorem. Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty} f(x)dx$ (b) $\int_c f(cos\Theta, sin\Theta)d\Theta$

UNIT – V:

Conformal mapping: Transformation of z-plane to w-plane by a function, Conformal transformation. Standard transformations- Translation; Magnification and rotation; Inversion and

reflection, Transformations like e^z , log z, z^2, and Bilinear transformation. Properties of Bilinear transformation, determination of bilinear transformation when mappings of 3 points are given (cross ratio).

TEXT BOOKS:

1) Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
2) Higher Engineering Mathematics by Ramana B.V, Tata McGraw Hill.
3) Complex Variables : Theory and Applications by H.S Kasana.

REFERENCES:

1) Complex Variables by Murray Spiegel,Seymour Lipschutz, et al. by Schaum's outlines series.
2) Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
3) Advanced Engineering Mathematics by Michael Greenberg –Pearson publishers.

COURSE OUTCOMES:

After learning the concepts of this paper the student will be able to

1) Find the expansion of a given function by Fourier series in the given interval and hence this concept can be used in the analysis of signals.
2) Find Fourier sine, cosine transforms and inverse transformations; hence this concept can be used in designing electrical circuits, signal processing and image processing etc.
3) Analyze the complex functions with reference to their analyticity and integration using Cauchy's integral theorem.
4) Find the Taylor's and Laurent series expansion of complex functions and solution of improper integrals can be obtained by Cauchy's-Residue theorem.
5) Understand the conformal transformations of complex functions can be dealt with ease and which can be used in different physical situations.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

3/-/-/3

(R15A0405) ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

OBJECTIVES

The course objectives are:

1. To introduce the student to the coordinate system and its implementation to electromagnetics.
2. To elaborate the concept of electromagnetic waves and transmission lines, and their practical applications.
3. To study the propagation, reflection, and transmission of plane waves in bounded unbounded media.
4. To present the concepts of transmission lines, and this is a prerequisite course for "Antennas"

UNIT - I:

Electrostatics: Review of coordinate system, Coulomb's Law, Electric Field Intensity - Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Equations for Electrostatic Fields, , Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations Illustrative Problems.

UNIT - II:

Magnetostatics: Biot - Savart's Law , Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law,

Maxwell's Equations (Time Varying Fields): Faraday's Law, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms, Conditions at a Boundary Surface: Dielectric - Dielectric, Illustrative Problems.

UNIT - III:

EM Wave Characteristics: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves - Definition, All Relations Between E & H , Reflection and Refraction of Plane Waves - Normal for both perfect Conductor and perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Poynting Vector and Poynting Theorem , Illustrative Problems.

UNIT - IV:

Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristics Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, , Distortion - Condition for Distortionless Transmisssion and Minimum Attenuation, Illustrative Problems.

UNIT - V:

Transmission Lines - II: SC and OC Lines, Input Impedance Relations, Reflection Coefficient, VSWR, Smith Chart - Configuration and Applications, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetics - Matthew N. O. Sadiku, 4th., Oxford Univ. Press.
2. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K. G. Balmain, 2nd Ed., 2000, PHI.
3. Transmission Lines and Networks - Umesh Sinha, Satya prakashan, 2001, (Tech. India Publications), New Delhi.

REFERENCES BOOKS:

1. Engineering Electromagnetics - Nathan Ida, 2ndEd., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Engineering Electromagnetics - William H. Hay Jr. and John A. Buck, 7thEd., 2006, TMH.
3. Electromagnetics Fields Theory and Transmission Lines - G. Dashibhushana Rao, Wiley India, 2013.
4. Networks, Lines and Fields - John D. Ryder, 2nd Ed., 1999, PHI.

OUTCOMES

Upon the successful completion of the course, students will be able to;

1. Study time varying Maxwell equations and their applications in electromagnetic problems
2. Determine the relationship between time varying electric and magnetic field and electromotive force
3. Analyze basic transmission line parameters in phasor domain
4. Use Maxwell equation to describe the propagation of electromagnetic waves in vaccum
5. Show how waves propagate in dielectrics and lossy media
6. Demonstrate the reflection and refraction of waves at boundaries
7. Explain the basic wave guide operation and parameters

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
3/-/-/3

(R22A0406) ANALOG & DIGITAL COMMUNICATIONS

COURSE OBJECTIVES:

1) To analyze and design various continuous wave Amplitude modulation and demodulation techniques.
2) To understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) To attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) To analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulsemodulation)
5) To understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

UNIT – I

Amplitude Modulation: Need for modulation, Amplitude Modulation - Time and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves -Switching modulator, Detection of AM Waves - Envelope detector, DSBSC modulation - time and frequency domain description, Generation of DSBSC Waves - Balanced Modulators, Coherent detection of DSB-SC Modulated waves, COSTAS Loop, SSB modulation - time and frequency domain description, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, Vestigial side band modulation.

UNIT - II

Angle Modulation: Basic concepts of Phase Modulation, Frequency Modulation: Single tone Frequency modulation, Narrow band FM, Wide band FM, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Signal- Armstrong Method, Direct method- Reactance Modulator, Detection of FM Signal: Balanced slope detector, Phase locked loop, Comparison of FM and AM., Concept of Pre-emphasis and de-emphasis.

UNIT - III

Transmitters: Classification of Transmitters, AM Transmitters, FM Transmitters

Receivers: Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, Image frequency, AGC, Amplitude limiting, FM Receiver, Comparison of AM and FM Receivers.

UNIT - IV

Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM.

Pulse Code Modulation: PCM Generation and Reconstruction, Quantization Noise, Non- Uniform Quantization and Companding, DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT - V

Digital Modulation Techniques: ASK- Modulator, Coherent ASK Detector, FSK- Modulator and Non-Coherent FSK Detector, FSK detection using PLL BPSK- Modulator, Coherent BPSK Detection, Principles of QPSK, Differential PSK and QAM.

Baseband Transmission and Optimal Reception of Digital Signal: A Baseband Signal Receiver, Probability of Error, Optimum Receiver, ISI, Eye Diagrams.

TEXTBOOKS:

1) Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
2) Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition, 2009, PHI.
3) Communication Systems-Simon Haykin, 2nd Edition.

REFERENCE BOOKS:

1) Principles of Communication Systems - Herbert Taub, Donald L Schilling, Goutam Saha, 3rd Edition, McGraw-Hill, 2008.
2) Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.

COURSE OUTCOMES:

Upon completing this course, the student will be able to

1) Analyze and Design various continuous wave Amplitude modulation and demodulation techniques.
2) Understand the concept of Angle modulation and demodulation, and the effect of noise on it.
3) Attain the knowledge about the functioning of different AM, FM Transmitters and Receivers.
4) Analyze and design the various Pulse Modulation Techniques (Analog and Digital Pulsemodulation)
5) Understand the concepts of Digital Modulation Technique, Baseband transmission and Optimum Receiver.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
3/-/-/3

(R22A0407) LINEAR AND DIGITAL IC APPLICATIONS

COURSE OBJECTIVES:

1) To introduce the basic building blocks of linear integrated circuits.
2) To teach the linear and non-linear applications of operational amplifiers.
3) To introduce the theory and applications of analog multipliers and PLL.
4) To teach the theory of ADC and DAC.
5) To introduce the concepts of wave form generation and introduce some special function ICs.

UNIT – I:

Operational Amplifier: Ideal and Practical Op-Amp, Op-Amp Characteristics, DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation – Inverting, Non-Inverting, Differential, Instrumentation Amplifier, AC Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger, Introduction to Voltage Regulators.

UNIT – II:

Op-Amp, IC-555 & IC 565 Applications: Introduction to Active Filters, Characteristics of Band pass, Band reject and All Pass Filters, Analysis of 1^{st} order LPF & HPF Butterworth Filters, waveform Generators – Triangular, Saw tooth, Square wave, IC555 Timer – Functional Diagram, Monostable and Astable Operations, Applications, IC565 PLL – Block Schematic, Description of Individual Blocks, Applications.

UNIT – III:

Data Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs – Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications.

UNIT – IV:

Digital Integrated Circuits: Classification of Integrated Circuits, Comparison of Various Logic Families, CMOS Transmission Gate.

Combinational Logic ICs – Specifications and Applications of TTL-74XX & CMOS 40XX Series ICs – Code Converters, Decoders, Encoders, Priority Encoders, Multiplexers, Demultiplexers, Parity Generators/Checkers, Parallel Binary Adder/Subtractor, Magnitude Comparators.

UNIT – V:

Sequential Logic IC's and Memories: Familiarity with commonly available 74XX & CMOS 40XX Series ICs – All Types of Flip-flops, Synchronous Counters, Decade Counters, Shift Registers.

Memories – ROM Architecture, Types of ROMS & Applications, RAM Architecture, Static & Dynamic RAMs.

TEXT BOOKS:

1) Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2) Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 2003.
3) Digital fundamentals – Floyd and Jain, Pearson Education,8th Edition ,2005

REFERENCES BOOKS:

1) Op Amps & Linear Integrated circuits-Concepts and Applications James M.Fiore, Cengage Learning/Jaico,2009.
2) Operational Amplifiers with linear integrated circuits by K.Lal kishore-Pearson,2009.
3) Linear integrated circuits and applications-Salivahana,TMH.
4) Modern digital electronics-RP Jain-4/e-TMH,2010.
5) Digital design principles and practices-John.F.Wakerly 3/e,2005.
6) Operational amplifiers with linear integrated cuircuits,4/e William D.Stanley, Pearson education India,2009.

COURSE OUTCOMES:

1) A thorough understanding of operational amplifiers with linear integrated circuits.
2) Also students will be able to design circuits using operational amplifiers for various applications.
3) Understanding of the different families of digital integrated circuits and their characteristics.
4) Understanding of D/A and A/D Converters.
5) Design of combinational and sequential circuits using the TTL & CMOS ICs.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**
3/-/-/3

(R22A0408) ELECTRONIC CIRCUIT ANALYSIS

Course Objectives:

Upon completing this course, the student twill be able to

1. Learn the concepts of Power Amplifiers.
2. To give understanding of tuned amplifier circuits
3. Understand various multivibrators using transistors and sweep circuits.

UNIT – I

Large Signal Amplifiers: Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class –C and D Amplifiers.

UNIT- II

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning and synchronous tuning

UNIT - III

Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

UNIT - IV

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement.

UNIT - V

Synchronization and Frequency Division: Pulse Synchronization of Relaxation Devices, Frequency division in Sweep Circuits, Stability of Relaxation Devices, Astable Relaxation Circuits, Monostable Relaxation Circuits, Synchronization of a Sweep Circuit with Symmetrical Signals.

Sampling Gates: Basic operating principles of Sampling Gates, Unidirectional and Bi-directional Sampling Gates, Four Diode Sampling Gate, Reduction of pedestal in Gate Circuits

TEXT BOOKS:

1. Jacob Millman, Christos C Halkias - Integrated Electronics, , McGraw Hill Education.

2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008,

REFERENCE BOOKS:

1. David A. Bell - Electronic Devices and Circuits, 5th Ed., Oxford.
2. Robert L. Boylestead, Louis Nashelsky - Electronic Devices and Circuits theory, 11th Ed.,Pearson, 2009
3. Ronald J. Tocci - Fundamentals of Pulse and Digital Circuits, 3rd Ed., 2008.
4. David A. Bell - Pulse, Switching and Digital Circuits, 5th Ed., Oxford, 2015.

Course Outcomes:

Upon completing this course, the student will be able to

1. Design the power amplifiers
2. Design the tuned amplifiers and analyse is frequency response
3. Design Multivibrators and sweep circuits for various applications.
4. Utilize the concepts of synchronization, frequency division and sampling gates

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

-/-/2/1

(R22A0484) ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

COURSE OBJECTIVES:

1) Familiarize the students with basic analog and digital communication systems.
2) Integrate the concepts of analog modulation techniques studied in theory with experiments.
3) Integrate the concepts of pulse modulation techniques studied in theory with experiments.
4) Integrate the concepts of Time and Frequency division multiplexing techniques studied in theory with experiments.
5) Integrate the concepts of digital modulation techniques studied in theory with experiments so that the students appreciate the knowledge gained from the theory course.

Note: Minimum 12 Experiments should be conducted: All these experiments are to be simulated first using MATLAB, COMSIM or any other simulation package and then to be realized in hardware.

LIST OF EXPERIMENTS

Analog Communication Experiments:

1) (i) Amplitude modulation and demodulation (ii) Spectrum analysis of AM
2) (i) Frequency modulation and demodulation (ii) Spectrum analysis of FM
3) DSB-SC Modulator & Detector
4) SSB-SC Modulator & Detector (Phase Shift Method)
5) Frequency Division Multiplexing & De multiplexing
6) Pulse Amplitude Modulation & Demodulation
7) Pulse Width Modulation & Demodulation
8) Pulse Position Modulation & Demodulation

Digital Communication Experiments:

1) PCM Generation and Detection
2) Time Division Multiplexing & Demultiplexing
3) Differential Pulse Code Modulation & Demodulation
4) Delta Modulation
5) Amplitude Shift Keying: Generation & Detection
6) Frequency Shift Keying: Generation & Detection
7) Binary Phase Shift Keying: Generation & Detection
8) Generation & Detection of DPSK

COURSE OUTCOMES

1. Analyze and understand the operation of a basic communication system.
2. Design the different analog modulation, demodulation circuits such as amplitude and frequency modulation, and also analyze their Spectrum.
3. Design various analog and digital pulse modulation techniques such as PAM, PPM, PWM, PCM, DPCM and DM.
4. Design and Analyze the TDM & FDM circuits.
5. Design the different digital modulation and demodulation circuits such as ASK, FSK, BPSK, and Differential PSK.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

-/-/2/1

(R22A0485) LINEAR AND DIGITAL IC APPLICATIONS LABORATORY

COURSE OBJECTIVES:

1) To study the hands-on experience on 741 Op-Amp applications.
2) To apply the perceptions of IC 555 Timer and PLL applications.
3) To Design and verify the IC 723 Voltage Regulator and Three terminal voltage regulators.
4) To apply the concepts of basic combinational logic and sequential circuit elements using HDL program.
5) To develop familiarity and confidence with designing, building and testing digital circuits, including the use of CAD tools.

Note: To perform any twelve experiments (choosing at least five from each part).

Part – I: Linear IC Experiments

1. OP AMP Applications – Adder, Subtractor, Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order)
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits – Using IC 741
7. IC 565 – PLL Applications.
8. Voltage Regulator using IC 723, Three Terminal Voltage Regulators – 7805, 7809, 7912.

EQUIPMENT REQUIRED:

1) 20 MHz / 40 MHz / 60 MHz Oscilloscope.
2) 1 MHz Function Generator (Sine, Square, Triangular and TTL).
3) Regulated Power Supply.
4) Multimeter / Volt Meter.

Part – II: HDL Simulation programs:

Programming can be done using any compiler. Download the programs on FPGA / CPLD boards and performance testing may be done using pattern generator / logic analyzer apart from verification by simulation using Cadence / Mentor Graphics / Synopsys / Equivalent front end CAD tools.

1. HDL code to realize all the logic gates
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with Priority)
4. Design of 8-to-1 multiplexer and 1 x 8 Demultiplexer.
5. Design of 4-bit binary to gray code converter
6. Design of 4-bit comparator
7. Design of Full adder using 3 modeling styles
8. Design of flip flops: SR, JK, T
9. Design of 4-bit binary, BCD counters (synchronous/ asynchronous reset)

COURSE OUTCOMES

1. Understand the various applications of linear IC's like 741 Op-amp applications.
2. Design the Multivibrator circuits using IC 555 and determine the frequency of oscillation and time delay.
3. Understand the functionality of IC 723 voltage regulator and determine the load and line regulations.
4. Design and simulate the combinational and sequential logic circuits using hardware description languages.
5. Analyze the results of logic and timing simulations and to use these simulation result to debug digital systems.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

-/-/2/1

(R22A0486) ELECTRONIC CIRCUIT ANALYSIS LABARATORY

.

Course Outcomes:

Upon completing this course, the students will be able to

1. Design power amplifiers and find its efficiency
2. Design tuned amplifiers and find its Q-factor
3. Design various multivibrators and sweep circuits. Understand the necessity of linearity
4. Design sampling gates and understanding the concepts of frequency division

List of Experiments:

Minimum of 9 experiments to be performed.

1. Design transformer coupled class A power amplifier and draw the input and output waveforms find its efficiency
2. Design class B power amplifier and draw the input and output waveforms, find 2nd order and above harmonics.
3. Prove that the complementary symmetry push pull amplifier eliminates cross over distortion.
4. Design class C power amplifier and draw the input and output waveforms
5. Design a single tuned amplifier and determine the Q of its tuned circuit practically.
6. Design a Bistable Multivibrator and analyze the effect of commutating capacitors and draw the wave forms at base and collector of transistors.
7. Design an Astable Multivibrator and draw the wave forms at base and collector of transistors.
8. Design a Monostable Multivibrator and draw the input and output waveforms
9. Draw the response of Schmitt trigger for gain of greater than and less than one.
10. Design a Bootstrap sweep circuit using BJT and draw its output time base waveform
11. Design a Miller sweep circuit using BJT and draw its output time base waveform.
12. Design a constant current sweep generator and draw input and output waveforms
13. Design unidirectional and bidirectional sampling gates
14. Prove practically Schmitt Trigger generates square wave
15. Frequency division with sweep circuit

Major Equipment required for Laboratories:

1. Computer System with latest specifications connected
2. Window XP or equivalent
3. Simulation software-Multisim or any equivalent simulation software
4. Regulated Power Suppliers, 0-30V 5. 20 MHz, Dual Channel Cathode Ray Oscilloscopes.
6. Functions Generators-Sine and Square wave signals
7. Multimeters
8. Electronic Components

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

-/-/4/2

(R22A0487) REAL TIME PROJECT/ FIELD BASED PROJECT

Project Requirements:

A project will typically involve the analysis, improvement, optimization or design of a process, operation, complex system or a component thereof. The student can select the project based on his/her areas of interest and to allow the course coordinator to make a judgment on the suitability of the project.

Project Definition:

•Brief background on the project
•Rationale for the project in terms of expected benefit and building on previous work
•Project scope, defining the area or department within which the project will be executed and solution developed.
Key policies or constraints that might apply to the project solution development, expected key deliverables of the project.
•Industrial engineering tools and techniques that can be used (if possible).
•A suggested high level outline of the approach that can be followed (if possible).
•A mentor/sponsor to guide the student from an industry perspective.
•Project application process and contact details.

Project Phases

The project consists of the following sequential phases:

Phase	Description
1	**Project planning** a. Background b. Problem Statement c. Project Aim & Project Approach
2	**Problem Investigation and Literature Review** a. Critical analysis of literature and the problem environment b. Identification of solution requirements and solution evaluation measures c. Data gathering d. Suggestion of an appropriate solution development approach
3	**Detailed design and/or problem solving**
4	**Completion and presentation of results**

5	Submission of Preliminary Project Report for assessment
6	Viva-Voce Examination

Important criteria for the evaluation of a project are:

1. Clarity on the expected benefit or value add of the project
2. The application of industrial engineering principles, tools and techniques
3. Clear evidence of engineering analysis and design, that is an improved or new approach, model, process, facility or system needs to be developed or formulated. In exceptional cases the project might be purely investigative in nature, but the complexity and value add need to be clear.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE- II Sem **L/T/P/C**

-/-/4/2

(R22A0XXX) GENDER SENSITTIZATION LAB

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course:

- To develop students' sensibility with regard to issues of gender in ontemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in
- contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and
- legal aspects of gender. This will be achieved through discussion of materials derived from
- research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to
- counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and
- economics.

- Men and women students and professionals will be better equipped to work and live together
- as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide
- protection and relief to women, the textbook will empower students to understand and respond
- to gender violence.

UNIT - I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards
Gender-Construction of Gender-Socialization: Making Women, Making Men
- Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share
the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -
Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*
Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives.
Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Lo

ve and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-
The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu
published by Telugu Akademi, Telangana Government in 2015.

MALLA REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

II Year B.Tech. ECE-II Sem **L/T/P/C**

2/-/-/0

(R22A00XX) PUBLIC POLICY AND GOVERNANCE

Course objectives:

1. To make the students understand in-depth analysis of public policy and to solve its ills prevailing in the society.
2. To provide an opportunity for the students to learn the basic areas of public policy analysis, implementation and evaluation.
3. To make understand the process and various approaches in public policy making
4. To understand the theories and issues of social coordination and the nature of all patterns of rule.
5. To make the students understand the techniques of governance and emerging trends in public and private governance its policy-making and implementation.

Unit-I

Introduction of Public Policy: Definition, Nature, Scope and Importance of Public Policy, Evolution of Public Policy and Policy Sciences, Public Policy and Public Administration. **Approaches to Public Policy Analysis:** The Process Approach, The Logical Positivist Approach, The Phenomenological Approach, The Participatory Approach and Normative Approach

Unit-II

Theories and Process of Public Policy Making: Theories and Models of Policy Making, Perspectives of Policy Making Process, Institutions of Policy Making.

Unit-III

Policy Implementation and Evaluation: Concept of Policy Implementation, Techniques of Policy Implementation, Concept of Policy Evaluation, Constraints of Public Policy Evaluation

Unit-IV

Introduction of Governance: Definitions, Issues and Controversies, Reinventing Government, Reforming Institutions: The State, Market and Public domain. **State and Governance:** Origin and types of State, Democratic State and Democratic Administration, Neo-Liberalism and Rolling Back State and Governance as Government.

Unit-V

Citizen and Techniques of Governance: Rule of Law and Human Rights, Accountability, Participation, Representation. **Techniques of Governance**: Openness and Transparency, Citizen Charter, Social Audit.

Emerging Trends in Public and Private Governance: An Overview, Market, Civil Society, Information and Communication Technology.

Text and Reference books

1. Introduction to Public Policy- Charles Wheelan, Naked Economics 2010.
2. Birkland Thomas A., (2005), An Introduction to The Policy Process: Theories, Concepts, And Models of Public Policy Making, Armonk; M.E. Sharpe.
3. Anderson J.E., (2006) Public Policy-Making: An Introduction, Boston, Houghton
4. Bardach, Eugene (1977), The Implementation Game: What Happens After a Bill Becomes a Law, Cambridge, MA: MIT.
5. Bell, S., and Hind moor, A. (2009) Rethinking Governance: The Centrality of the State in Modern Society, Cambridge: Cambridge University Bell, Stephen and Andrew Hind moor.
6. Joyee M. Mitchell & William C. Mitchell, Political Analysis & Public Policy: An Introduction to Political Science, Thomson Press Limited, New Delhi, 1972.
7. R.K. Sapru, Public Policy, Art and Craft of policy Analysis, PHI learning private limited, New Delhi, 2011.
8. Brian W. Hogwood & Lewis A. Gunn, Policy Analysis for the Real world, Oxford University, Press, 1986.

Course Outcomes:

1. Understand public policy analysis and they will be able to understand policy evaluation and implementation.
2. Understand the public policy and governance on the largest gamut of its canvas.
3. Students will understand the what are emerging trends in public and private governance and various theories in public policy making
4. Understands various concepts, and techniques of governance and its policy-making decisions