Program Structure and Syllabus of B. Tech II Year (I & II Semesters)

ELECTRONICS & COMMUNICATION ENGINEERING (ECE)

R22 Regulations

ANURAG UNIVERSITY
Venkatapur (V), Ghatkesar (M), Medchal-Malkajgiri (Dt.), Hyderabad, Telangana, INDIA
info@anurag.edu.in; http://anurag.edu.in

B.TECH II YEAR I SEMESTER [5 T + 3 P + 1 M]

S. No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A53008	BS	Numerical Techniques & Complex Variables	3	0	0	3
2	A53013	ES	Electronic Devices & Circuits	3	0	0	3
3	A53021	PC	Signals and Systems	3	1	0	4
4	A53022	BS	Introduction to Probability Theory and Statistics	2	1	0	3
5	A53023	ES	Object Oriented Programming through Java	2	0	2	3
6	A53207	ES	Electronic Devices & Circuits Lab	0	0	3	1.5
7	A53208	PC	Signals and Systems Lab	0	0	3	1.5
8	A53209	HS	Soft Skills for Success Lab	0	0	2	1
9	A53007	MC	Environmental Studies	2	0	0	0
			TOTAL	**15**	**02**	**10**	**20**

B. **TECH** II YEAR II SEMESTER [5 T + 3 P + 1 M]

S.No	Course Code	Category	Course	Hours per week			Credits
				L	T	P	
1	A54018	PC	Electronic Measurements and Instrumentation	3	0	0	3
2	A54019	PC	Electro Magnetic Theory and Transmission Lines	3	1	0	4
3	A54020	PC	Pulse & Integrated Circuits	3	0	0	3
4	A54006	PC	Digital Circuits	2	1	0	3
5	A54021	PC	Electronic Circuit Analysis	3	0	0	3
6	A54211	PC	Electronic Circuit Analysis Lab	0	0	2	1
7	A54212	PC	Pulse & Integrated Circuits Lab	0	0	3	1.5
8	A54213	PC	Digital Circuits Simulation Lab	0	0	3	1.5
9	A54022	MC	Gender Sensitization	2	0	0	0
			TOTAL	**16**	**02**	**08**	**20**

NUMERICAL TECHNIQUES & COMPLEX VARIABLES

(Common to ECE &EEE)

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53008	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Course Objectives

Course Objectives of Numerical Techniques & Complex Variables are to:

1. Determine the approximate solutions of algebraic and transcendental equations using iterative methods and interpolate the values for the given data.
2. Finding the integration of given data points with various step sizes by using numerical methods and also determine the solution of linear first order initial value problems using single and multi-step methods.
3. To introduce the basic functions, Differentiation and integration of complex valued functions.
4. Evaluation of integrals using Cauchy's integral formula and series expansion of complex functions.
5. Determine residues and use the residue theorem to compute several kinds of real integrals

Course Outcomes

At the end of this Numerical Techniques & Complex Variables course, students will be able to:

1. Solve the algebraic and transcendental equations using numerical methods and also finding the polynomial using given set of tabulated values and estimation of the functional value within the data by Interpolation.
2. Apply the method of Numerical Integration for engineering problems and also solve the first order initial value problems using Taylor's, Euler and Runge-Kutta methods.
3. Analyze the complex functions with reference to their analyticity and finding the harmonic function. Apply complex analysis in the study of mechanics of solids and liquids, thermodynamics, electrical fields etc
4. Find the integral value by Cauchy's integral formula and also the Taylor's and Laurent's series expansion of complex functions.
5. Apply Residue theorem which is an elegant theorem in complex integration and useful in evaluating complicated real integrals.

UNIT I

Introduction: **Solution of Non- linear Equations:** Solution of Algebraic and Transcendental Equations – The Bisection Method – The Method of False Position – Newton-Raphson Method.

Interpolation: Introduction- Finite differences (Forward and Backward differences), Newton's forward and backward difference interpolation formulae, Lagrange's Interpolation formula.

UNIT II

Numerical integration: Newton's-cotes Quadrature formula, Trapezoidal rule, Simpson's 1/3rd and 3/8 rules.

Numerical solution of Ordinary Differential Equations: Solution by Taylor's series- Picard's Method of successive Approximations- Euler and modified Euler's methods – Runge-Kutta Method.

UNIT III

Functions of a complex variable: Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions, Construction of analytic functions using Milne – Thompson method.

UNIT IV

Complex Integration – Power series: Line integral, Evaluation along a path and by indefinite integration, Cauchy's integral theorem, Cauchy's integral formula, Generalized integral formula. Radius of convergence, Expansion in Taylor's series, Maclaurin's series and Laurent series.

UNIT V

Contour Integration: Singularities: Poles and Residues, Evaluation of residues by formula and by Laurent series, Residue theorem.
Evaluation of integrals of the type

(a) $\int_{C}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ (b) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$

TEXT BOOK

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

REFERENCE BOOKS

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
2. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
5. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
6. Spiegel, Murray R, Schaum's Complex Variables.B. S. Grewal, Numerical Methods in Engineering & Science, Khanna Publishers

ELECTRONIC DEVICES AND CIRCUITS

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A53013	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Prerequisite: APPLIED PHYSICS

Course Objectives

1. To learn the characteristics of diode and how to make use of diode in different applications
2. To explain the operation and characteristics of transistors in different modes
3. To apply different biasing methods to make transistor stable
4. To explain the operation and design of FET amplifiers.
5. To analyse feedback amplifiers

UNIT I

P-N JUNCTION DIODE AND RECTIFIERS: Review of P-N Junction Diode Volt-Ampere Characteristics, Transition and Diffusion Capacitances, Diode Equivalent Circuits, The P-N Junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Inductor Filters, Capacitor Filters, Voltage Regulation Using Zener Diode. Zener Diode Characteristics.

UNIT II

BIPOLAR JUNCTION TRANSISTOR AND FIELD EFFECT TRANSISTOR: The Junction Transistor, BJT Operation, Common Base, Common Emitter and Common Collector Configurations, Transistor as an Amplifier. The Junction Field Effect Transistor Pinch –Off Voltage –Volt –Ampere Characteristics, MOSFET Operation, MOSFET Characteristics in Enhancement and Depletion Modes.

UNIT III

TRANSISTOR BIASING AND STABILIZATION: Operating Point, The DC and AC Load Lines, Need for Biasing, Types of biasing methods: Fixed Bias, Collector Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against Variation in V_{BE} and β, Bias Compensation Using Diodes and Transistors. Thermal Runway, Thermal Stability.

UNITIV

BJT AND FET AMPLIFIERS: BJT Hybrid Model, Determination of h-Parameters from Transistor Characteristics, Comparison of CB, CE and CC Amplifier Configurations. The JFET Small Signal Model, FET Common Source Amplifier, Common Drain Amplifier, FET as Voltage Variable Resistor, Comparison of BJT and FET, The Uni-junction Transistor

UNIT V

FEED BACK AMPLIFIERS: Concepts of feedback. Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Problems.

TEXT BOOKS

1. Integrated Electronics Analog and digital circuits and systems– J. Millman,C.C.Halkias, and SatyabrataJit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, 9th Edition,2006.
3. Introduction to Electronic Devices and Circuits- Rober T. Paynter PE,2005.
4. Electronic Devices and Circuits – A. P. Godse Technical Publications.2009.

REFERENCE BOOKS

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 2003.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 2001.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore,2004,BSP

Course Outcomes

After completing the course, students should be able to

1. Apply the diode concepts in different applications
2. Understand the BJT, FET and revolutionary MOSFET that lead to the development of integrated circuits and study their construction and characteristics
3. Compare different biasing methods and compensation methods to make transistor stable
4. Design and analyse simple basic amplifiers using Hybrid model.
5. Design and analyse feedback amplifiers using BJTs

SIGNALS AND SYSTEMS

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A53021	Core	L	T	P	C	CIE	SEE	Total
		3	1	0	4	40	60	100

Prerequisite: MATHEMATICS-I

Course Objectives

1.To understand signals and systems representations/classifications and also describe the time and frequency domain analysis of continuous time signals with Fourier series, Fourier transforms and Laplace transforms

2.To understand sampling theorem, with time and frequency domain analysis of discrete time signals using DTFT and Z transforms.

3.To analyze signals in time domain using convolution sum and integral.

4. To analyze Linear Time Invariant (LTI) Systems in time and Frequency domains.

UNIT I

Classification of Signals and Systems:

Definition and classification of signals-Continuous, Discrete, Periodic, Aperiodic, Deterministic, Random, Even, Odd, Energy and Power, Elementary Signals-Step, Ramp, Impulse, Sinusoidal, Signum, Real and Complex Exponentials, Operations on Signals-Addition, Multiplication, Scaling, Shifting, Folding, Convolution & Correlation. Definition and classification of systems- Continuous, Discrete, Linear, Non Linear, Causal, Non Causal, Stable, Unstable, Time variant, Time Invariant, LTI systems.

UNIT II

Analysis of Continuous Time Signals

Fourier Series for periodic signals, Properties of Fourier Series, Dirichlet's Conditions, Trigonometric & Exponential Fourier Series, Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals, Laplace Transform-Definition , ROC , Properties , Inverse Laplace transform , The S-plane and BIBO stability , Transfer functions , System response to standard signals.

UNIT III

LTI Continuous Time Systems

Impulse response, Convolution integrals, difference equations, Analysis of continuous time LTI system using Fourier and Laplace transforms, Distortion less transmission through a system, Bandwidth of systems, relation between bandwidth and rise time.

UNIT IV

Analysis of Discrete Time Signals

Sampling of continuous time signals, Sampling theorem, Reconstruction of signal from its samples, effect of under sampling –Aliasing, Fourier transform of Discrete time signals (DTFT)-Properties, Z Transform-Definition , ROC , Properties , Inverse Z transform.

UNIT V

LTI Discrete Time Systems

Impulse response, Convolution sum, difference equations, Analysis of discrete time LTI system using Fourier and Z transforms, recursive and non recursive discrete time systems.

TEXT BOOKS

1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.1997.

REFERENCES

1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition,2008.
2. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.
3. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.Publications, 2nd Edition, 2005.

Course Outcomes

Up on completion of the course, the student will be able to:

1.Define, represent and differentiate types of signals and systems in continuous, discrete time domains and can perform various mathematical operations on them.

2.Compute/Evaluate Fourier series of periodic signals and determine Fourier transform of various signals.

3.Analyze the properties of continuous time signals and systems using Laplace & Fourier transforms and determine the response of LTI system to known inputs.

4.Illustrate signal sampling and its reconstruction.

5.Analyze the properties of discrete time signals and systems using DTFT & Z transforms and determine the response of LTI system to known inputs.

INTRODUCTION TO PROBABILITY THEORY AND STATISTICS

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A53022	Core	L	T	P	C	CIE	SEE	Total
		2	1	0	3	40	60	100

Course Objectives

1. To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and Communication Engineering.
2. To introduce students to the basic methodology of “probabilistic thinking” and to apply it to problems;

3. To understand basic concepts of probability theory and random variables, how to deal with multiple random variables, Conditional probability and conditional expectation, joint distribution and independence, mean square estimation.
4. To learn statistics which is art of learning from data and its analysis
5. To apply estimation method to predict unknown population parameter.

UNIT I

PROBABILITY: Probability Introduced through Sets, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Introduced through Axioms, Probability Introduced through Relative Frequency, classical definition of Probability, Mathematical Model of Experiments, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

UNIT II

RANDOM VARIABLE AND OPERATIONS ON SINGLE RANDOM VARIABLE: Definition of a Random Variable, Types of Random Variables, Conditions for a Function to be a Random Variable, Distribution and Density functions, Examples- Binomial, Poisson, Uniform Gaussian, Conditional Distribution and Conditional Density function,Expected Value of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Moment Generating Function.

UNIT III

MULTIPLE RANDOM VARIABLES AND OPERATIONS ON MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution and Joint Density Functions , Marginal Distribution and Marginal Density Functions, Statistical Independence, Conditional Distribution and Density functions, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected),Expected Value of a Function of Joint Random Variables, Joint Moments about the Origin, Joint Central Moments, Joint Moment Generating Function, Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties,

UNIT IV

INTRODUCTION TO STATISTICS: Introduction to Statistics: Population and Samples, Describing Data sets, Summarizing Data sets, normal data sets, paired data sets and the

Sample correlation coefficient, mean, mode, median, Sampling Distribution of mean (known and unknown) Proportions, Estimation: Point Estimation, Interval Estimation, Bayesian Estimation

UNIT V

TEST OF HYPOTHESIS: Null Hypothesis, Hypothesis concerning one mean, Hypothesis concerning two means, Estimation of proportions, Hypothesis concerning one proportion, Hypothesis concerning several proportions, Significance tests: student's T-test, F-test, Goodness of fit, Estimation of Proportions, Curve fitting: The method of least squares, Curvilinear Regression, Multiple Regression, correlation for univariate and bivariate Distributions

TEXT BOOKS

1. Introduction to Probability and statistics for engineers and scientists-Sheldon M.Ross, 5th Edition2014.

2. Introduction to Probability and statistics –J.Susan Milton,Jesse C.Arnold,4th Edition, Tata McGraw Hill2009.
3. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.TMH.
4. Probability, Random Variables and Stochastic Processes – Athanasius Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

REFERENCES

1. Probability and random processes with stochastic processes- Mallikarjuna Reddy Cengae Learning, 4th edition, 2013.
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, 2012.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003.
5. Probability and Statistics-Shahnaz Bathul, 2006

Course Outcomes

After completing the course, students should be able to

1. Apply Concepts of probabilities using an appropriate sample space.
2. Apply Simple probabilities and expectations from probability density functions (pdfs) Likelihood ratio tests from pdfs for statistical engineering problems. Least -square & maximum likelihood estimators for engineering problems.
3. Compute the distribution of a function of several random variables.
4. Analyze Statistical Properties such as Mean and variance for sample data.
5. Analyze and minimize the residuals between actual data and observed data

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	**Category**	**Hours / Week**			**Credits**	**Marks**		
A53023	Core	L	T	P	C	CIE	SEE	Total
		2	0	2	3	40	60	100

Course Objectives

Course Objectives of Object Oriented Programming are to:

1. Impart knowledge of core language features of Java.
2. Appraise the concepts of Inheritance and Polymorphism.
3. Elaborate the use of Packages and Exception Handling.
4. Emphasize collection frameworks and multithreading in Java
5. Familiarize Event Handling and Applets.

Course Outcomes:

At the end of this Object Oriented Programming course, students will be able to:

1. Appraise the basic concepts of java.
2. Implement inheritance and polymorphism.
3. Develop packages and implement exception handling features.
4. Identify usage of collection framework and build multi-threaded applications.
5. Design Applets by using Event Handling features.

UNIT I

Java Basics: History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, static keyword, Garbage collection, Overloading methods and constructors, parameter passing.

UNIT II

Inheritance: Introduction, forms of inheritance- specialization, specification, construction**,** extension, limitation, combination, Member access rules, super uses, using final with inheritance.

Polymorphism: Method overriding, Abstract classes, Object class

UNIT III

Packages and Interfaces: Defining, Creating and Accessing a Package, importing packages, differences between classes and interfaces, File, Byte Streams, Character Streams.

Exception Handling - Concepts of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

UNIT IV

Package java.util- The Collection Interfaces, The Collection classes: LinkedList Class, HashSet Class. TreeSet Class, String Tokenizer, Date, Random, Scanner.

Multi-Threading: Differences between multi-threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT V

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. **Applets** – Concepts of Applets, differences between applets and applications, life cycle of an applet, create applets, passing parameters to applets.

TEXT BOOK

1. Herbert Schildt, Java- The Complete Reference, Seventh edition, Tata McGraw Hill,2006.

REFERENCE BOOKS

1. Bruce Eckel, Thinking in Java, Fourth Edition, Prentice Hall, 2006.
2. Y. Daniel Liang, Introduction to Java programming, Tenth Edition, Pearson education, 2014.

ELECTRONIC DEVICES AND CIRCUITS LAB

B. Tech II Year I Semester					Dept. of Information Technology			
Code	Category	Hours / Week			Credits	Marks		
A53207	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. To operate and characterize the behavior of devices and circuits.
2. To understand the functionality of semiconductor devices.
3. To design and test rectifiers with and without filters
4. To design and test amplifiers circuits.
5. Implementation of a few experiments using Arduino.

PART A:

ELECTRONIC WORKSHOP PRACTICE:

Identification, Specifications, Testing of R, L, C, Components (Color Codes),

1. Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specification and Testing of Active Devices, Diodes, BJT's LOW power JFET's, MOSFET's, Power Transistors, LED's, Arduinos, UJT.
3. Study and operation of
   a. Multi-meters (Analog and Digital)
   b. Regulated Power Supplies
   c. Function Generator
   d. CRO

PART B

(For Laboratory Examination – Minimum of 10 experiments)

List of Experiments

1. Forward & Reverse Bias Characteristics of PN Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters
5. Input & output characteristics of Transistor in CB Configuration.
6. Input & output Characteristics of Transistor in CE Configuration.
7. FET characteristics.
8. Measurement of h- parameters of transistor in CB, CE, CC configurations
9. MOS characteristics
10. Current Shunt and Voltage Series Feedback Amplifiers.
11. Frequency Response of FET Amplifier (Common source).
12. Arduino based voltage regulator.
13. Switching circuit with Arduino to control LED
14. UJT Characteristics.

Requirements

1. Regulated power supplies (RPS)
2. CRO's : 0-20MHZ
3. Function Generator : 0-1 MHZ
4. Multimeters
5. Decade Resistance Boxes / Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) : 0-20μA, 0-50μA, 0-100μA, 0-200μA,0-10 mA
8. Voltmeters (Analog or Digital) : 0-50V,0-100V, 0-250V
9. Electronic Components : Resistors, Capacitors, BJTs, LCDs, Arduinos, UJTs, FETs, LEDs, MOSFETs, diodes Ge & Si type, Transistors NPN, PNP type

Course Outcomes

After completing the course, students should be able to

1. Understand electronic test equipment to characterize the behavior of devices and circuits.
2. Plot the characteristics of semiconductor devices to understand their functionality.
3. Design and test rectifiers with filters

4. Design and test amplifier circuits and interpret the results.
5. Design and test of Feedback amplifiers circuits and interpret the results.

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SIGNALS AND SYSTEMS LAB

B. Tech II Year I Semester					Dept. of Information Technology			
Code	Category	Hours / Week			Credits	Marks		
A53208	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

List of Experiments (12 Experiments to be done):

Course Objectives

1. To be able to describe signals mathematically and understand how to perform mathematical operations on signals. The operations should include operations on the dependent as well as independent variables.
2. To understand system properties - linearity, time invariance, presence or absence of memory, causality, bounded-input bounded-output stability, and invertability. Be able to identify whether a given system exhibits these properties and its implication for practical systems.
3. To be able to perform the process of convolution between signals and understand its implication for analysis of linear time-invariant systems. Understand the notion of an impulse response.
4. To be able to solve a linear constant coefficient differential equations using Laplace transform techniques.
5. To develop basic problem-solving skills and become familiar with formulating a mathematical problem from a general problem statement.

List of Experiments:

1. Basic operations on matrices.
2. Generation of various signals and sequences (periodic),such as unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Operation on signal and sequence such as addition, multiplication, scaling, folding, shifting, computation of energy and average power.
4. Finding the even and odd parts of continuous signals/sequences, real and imaginary part of continuous signals/sequences.
5. Convolution between two signals and any two sequences.
6. Auto correlation and cross correlation between two signals and any two sequences.
7. Verification of linearity and time invariance properties of a given continuous /discrete system.
8. Computation of unit sample, unit step and sinusoidal response of the given LTI system and verifying its physical realization and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform synthesis using Laplace transforms.
12. Locating the zeros and poles and plotting the pole zero maps in s-plane and z-plane for the given transfer function.
13. Sampling theorem verification.
14. Removal of noise by auto correlation/ cross correlation.

Requirements

For the basic simulation lab.

1. Computer System with latest specifications.
2. Connected in LAN (Optional)
3. Operating system (Windows XP or higher)
4. MATLAB or SCILAB

Course Outcomes

After completing the course, students should be able to:

1. Describe the basics of MATLAB/SCILAB syntax, functions and programming.
2. Generate and characterize various continuous and discrete time signals.
3. Perform the basic operations on the signals.
4. Design and analyze linear time-invariant (LTI) systems and compute its response.
5. Analyze the spectral characteristics of signals using Fourier analysis, Laplace transform and Z-transform.

SOFT SKILLS FOR SUCCESS LAB

B. Tech II Year I Semester					Dept. of Information Technology			
Code	Category	Hours / Week			Credits	Marks		
A53209	Core	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

Introduction: The primary focus of the course is to highlight various categories and applications of Soft Skills through various cases taken from the real field and other research case studies. The fundamental concepts and distinctions between Soft Skills and Hard Skills are discussed. The course is tailored very effectively to introduce various Soft Skill application examples.

Course Objectives

To identify and participate in meaningful conversations

Course Outcomes

On successful completion of the course, students will be able to:

1. exhibit communication skills in various situations
2. handle the emotions with peers and classmates
3. demonstrate respect for the opinions, personal space, and beliefs of others
4. connect and work with others to achieve a set task
5. assess and identify the requirements and strengths within the team

UNIT I

Soft Skills Development: An Introductory Overview - Self-Discovery & Goal Setting - Johari Window

UNIT II

Personality Development - Body Language - Etiquette & Manners

UNIT III

Presentation Skills (Individual & Team) Oral & Written - Teamwork & Leadership Qualities

UNIT IV

Debates - Group Dynamics - Dos & Don’ts -Techniques to participate and conclude

UNIT V

Emotional Intelligence - Conflict Management - Stress Management

Minimum requirements of infrastructural facilities for “Soft Skills for Success” Laboratory:

A spacious room with movable chairs, a Public Address System etc.

REFERENCES

1. Butterfield, Jeff. Soft Skills for Everyone**.** New Delhi: Cengage Learning, 2010.
2. Chauhan, G.S. & Sangeeta Sharma. Soft Skills. New Delhi: Wiley, 2016.
3. Goleman, Daniel. Working with Emotional Intelligence. London: Banton Books, 1998.
4. Hall, Calvin S. et al. Theories of Personality. New Delhi: Wiley, 2011.
5. Holtz, Shel. Corporate Conversations. New Delhi: PHI, 2007.

ENVIRONMENTAL STUDIES

B. Tech II Year I Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A53007	Core	L	T	P	C	CIE	SEE	Total
		2	0	0	0			

PREREQUISITES: Engineering Chemistry

Course Objectives

1. To introduce knowledge about the environment.
2. To introduce students to the concepts of pollution, biodiversity
3. To develop an awareness about global environmental problems.
4. To learn to protect environment and awareness on legal issues
5. To learn about importance of sustainable development and role of IT in environment.

UNIT I

Multidisciplinary nature of environmental studies: Definition, scope and importance – need for public awareness.

Ecosystems: Concept of an ecosystem – classification, structure and function of different ecosystems - producers, consumers and decomposers. - energy flow in the ecosystem - ecological succession - food chains, food webs and ecological pyramids.

Biodiversity and its conservation: Introduction - Definition: genetic, species and ecosystem diversity. - bio-geographical classification of India - value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation - hot-spots of biodiversity - threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. ICUN categories of biodiversity and RED DATA book - conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT II

Natural Resources: Renewable and non-renewable – natural resources and associated problems: forest resources – use and over – exploitation, deforestation,– timber extraction, mining, dams and other effects on forest and tribal people: water resources – use and over utilization of surface and groundwater – floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources. - Food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity. - Energy resources: growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification. role of an individual in conservation of natural resources: equitable use of resources for sustainable lifestyles.

UNIT III

Environmental pollution: Definition, cause, effects and control measures of different kinds of pollution (Air, Water, Soil, Marine, Noise, Thermal, Nuclear, e –waste)

Carbon capture & sequestration – different storage sources, major disadvantages, environmental effects

Social issues and the environment: From unsustainable to sustainable development - urban problems related to energy -water conservation, rain water harvesting, and watershed management. -climate change, global warming, ozone layer depletion, nuclear accidents and holocaust.

UNIT IV

Waste management technology: Solid waste management: causes, effects and control measures of urban and industrial wastes. - role of an individual in prevention of pollution, disaster management: floods, earthquake, cyclone and landslides. wastewater and sewage treatment technology: primary, secondary and tertiary treatments. bioremediation, phyto-remediation, ZLD (zero liquid discharge), membrane technology. application of GIS and GPS system in environmental science.

Environmental policy, rules and regulations. EIA (Environmental Impact Assessment) & EMP (ENVIRONMENTAL Management Plan) – Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act - Wildlife Protection Act –Forest Conservation Act.-Public awareness. global environmental problems and global efforts.

UNIT V

Towards sustainable future: concept of sustainable development, threats of sustainability, population and its explosion, over exploitation of resources, strategies for achieving sustainable development. environmental education, conservation of resources. urban sprawl, sustainable cities and sustainable communities, human health. Role of IT in environment, environmental ethics, concept of green building, basic principles of green engineering, clean development mechanism (CDM), low carbon life cycle, polluters-pay principle.

Course Outcomes

1. Understand fundamental physical and biological principles that govern natural processes.
2. Understand fundamental concepts from the social sciences and humanities underlying environmental thought and governance.
3. Integrate and apply perspectives from across the natural sciences, social sciences, and the humanities in the context of complex environmental problems
4. Communicate integrated perspectives on complex environmental problems in the form of written and oral argument to both professional and lay audiences.
5. Design and conduct independent research that contributes to environmental thought and/or problem solving.

TEXT BOOKS:

1. Erach Bharucha.,“Textbook of Environmental Studies for Undergraduate Courses”, University Press Private Limited., Reprinted in 2005.
2. Rajagopalan, R., “Environmental Studies: From Crisis to Cure”, 2nd ed, Oxford University Press., 2005.

REFERENCES:

1. Richard T.Wright., “Environmental Science: Towards a Sustainable Future”,10th ed, PHL Learning Private Ltd, New Delhi., 2008.
2. Gilbert M.Masters, and Wendell P.Ela.,“Environmental Engineering and Science”,4th ed, PHI Learning Pvt. Ltd., 2008

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54018	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Prerequisite: Applied Physics

Course Objectives:

1. To develop an awareness to various electronic measurement Concepts
2. To know the operation and design of different electronic instruments
3. To learn the operation of various generators and analyzers
4. To measure using AC and DC bridges
5. To Familiarize with different types of transducers.

UNIT I

Proposed: Block Schematics of Measuring Systems, Performance Characteristics: Static Characteristics: Accuracy, Resolution, Precision, Gauss Error, Types of Errors. Dynamic Characteristics: Repeatability, Reproducibility, Fidelity, Lag.
Analog Measuring Instruments: D' Arsonval Movement, DC Voltmeter and Ammeter, rectifier type AC Voltmeters, Ohmmeters, Multimeter, Extension of Range of voltmeter and ammeter , True RMS Responding Voltmeters. Ramp type DVM, Digit display.

UNIT II

Oscilloscopes: CRT, Block Schematic of CRO, Time Base Circuits, Delay lines, Dual Beam CRO. Applications, Specifications.
Special purpose oscilloscopes: Sampling oscilloscopes, Storage oscilloscopes, digital Storage CROs, Frequency and Period Measurements. Lissajous Figures, CRO Probes.

UNIT III

Signal Generators: AF Signal Generator, RF Signal Generator, Function Generator, Specifications.
Signal Analyzers: AF Wave Analyzers, HF Wave Analyzers, Heterodyne wave Analyzers, Harmonic Distortion Analyzers, and Spectrum Analyzers.

UNIT IV

Measurements using DC and AC Bridges: Detectors and Generators for bridges. Wheatstone Bridge, Kelvin Bridge, Maxwell, Hay, Anderson Bridges, Schering, Wagner's ground connection.

UNIT V

Transducer: Classification, Piezoelectric Transducer, Thermocoupler, Resistance Thermometers, Strain gauges: Bonded, unbounded, LVDT, Variable Capacitance Transducers, MEMS.
Measurement of Physical Parameters: Flow, displacement, Pressure, temperature, pH, gases. Data Acquisition Systems.

TEXT BOOKS

1. Electronic Instrumentation: H.S.Kalsi - TMH. Z'a Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques:A.D. Helbincs. W.D. Cooper: PHI 56 Edition 2003.

REFERENCE BOOKS

1. Electronic Measurements and Instrumentation- K. Lal Kishore, Pearson Education 2010.
2. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
3. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

Course Outcomes

After completing the course, students should be able to

1. Describe the measuring concepts and instrumentation systems.
2. Explain the operation of oscilloscopes
3. Use and various generators and analyzers
4. Apply the measuring concepts using AC and DC bridges
5. Calculate physical parameters.

ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54019	Core	L	T	P	C	CIE	SEE	Total
		3	1	0	4	40	60	100

UNIT I

Sources of electromagnetic fields- Review of Vector calculus, Static electric fields: Coulombs law, Gauss law and electrostatic potential, Magnetostatics: Ampere's law, Magnetic vector potential, self and mutual inductance, Time varying fields, Maxwell's Equations, Boundary conditions at Media Interface.

UNIT II

Electromagnetic Waves: Wave Equation, Uniform plane electromagnetic waves, Propagation of electromagnetic waves in different media, polarization, Continuity equation, Poynting theorem.

UNIT III

Plane Waves at a Media Interface- Plane wave in arbitrary direction, Reflection and refraction at dielectric interface, Total internal reflection, wave polarization at media interface, Reflection from a conducting boundary

UNIT IV

Transmission Lines- Equations of Voltage and Current on TX line, Propagation constant and characteristic impedance, and reflection coefficient and VSWR, Impedance Transformation on Loss-less and Low loss Transmission line, Power transfer on TX line, Smith Chart, Applications of transmission lines: Impedance Matching, use transmission line sections as circuit elements.

UNIT V

Antennas **:** Introduction, Basic Antenna Parameters-patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain - Resolution, Antenna Apertures, Effective Height, Fields from oscillating dipole, Field zones, shape-impedance considerations, Antenna Temperature, Front to back ratio, Antenna Theorem. Wave Propagations **-** Introduction, Definitions, categorizations and general classifications, different modes of wave propagation

TEXT BOOKS

1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 4th ed., 2001.
2. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005
3. E.C. Jordan & K.G. Balmain, Electromagnetic waves & Radiating Systems, Pearson, 2nd Edition 2015

4. Antennas and wave propagation – John D. Kraus, Ronald J. Marhefka and Ahmad S. Khan, TMH 4th Edn.,(Special Indian edition) 2010.

REFERENCE BOOKS

1. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech.India Publications), New Delhi, 2001
2. Narayana Rao, N: Elements of Engineering Electromagnetics, Pearson, 6th Edition 2006.
3. Engineering Electromagnetic – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
4. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed.,2003.
5. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

Course Outcomes

After completing the course, students should be able to

1. Apply Maxwell's equations to solve equations of EM fields
2. Characterize uniform plane waves and wave propagation
3. Calculate reflection and transmission of waves at media interface
4. Explain the characteristics and wave propagation on high frequency transmission lines
5. Describe the principle of radiation and radiation characteristics of an antenna

PULSE & INTEGRATED CIRCUITS

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54020	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

UNIT I

LINEAR AND NONLINEAR WAVE SHAPING: Linear Wave Shaping: High pass & Low pass RC circuits and their responses for sinusoidal, step voltage, pulse, square wave, and ramp inputs. High pass RC circuit as Differentiator, Low pass RC circuit as an Integrator, Nonlinear Wave Shaping: Diode clippers, clipping at two independent levels, Clamping operation, Clamping circuits using diodes, Clamping circuit theorem, comparator circuit.

UNIT II

MULTIVIBRATORS: Multivibrators: Transistor as a switch, Transistor- switching times. Analysis and Design of Bistable, Monostable and Astable Multivibrator using Transistors, Schmitt trigger using transistors.

UNIT III

INTEGRATED CIRCUITS: Classification, Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-amp characteristics-DC and AC Characteristics. 741 Op-Amp and its Features, Modes of operation-inverting, non-inverting, differential. Applications- Basic Applications of Op-Amp, Sample & Hold Circuits, Differentiators and Integrators, Comparators, Schmitt Trigger.

UNIT IV

ACTIVE FILTERS, TIMERS & PHASE LOCKED LOOPS: Active Filters: First Order and Second Order Low Pass, High Pass filters, Band Pass, Band Reject and All Pass Filters. **555 Timers:** Functional Diagram, Monostable, Astable Operations and Applications, Schmitt Trigger. **Phase Locked Loop (PLL):** Block Schematic, Principles and Description of Individual Blocks of 565, VCO.

UNIT V

DATA CONVERTERS: Converters: D-A & A-D Converters- Introduction, Basic DAC Techniques - Weighted Resistor Type, R-2R Ladder Type, Inverted R-2R Type. Different types of ADCs - Parallel Comparator Type, Counter Type, Successive Approximation Register Type and Dual Slope Type, DAC/ADC Specifications.

TEXT BOOKS.

1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, and Mothiki S. Prakash Rao, 2ed., 2008, TMH.

2. Linear Integrated Circuits -D. Roy Choudhury, New Age International (p)Ltd, 3" Ed., 2008.

3. Op-Amps and Linear Integrated Circuits - Concepts and Applications by James M. Fiore, Cengage/ Jaicc, 2/e, 2009.

REFERENCE BOOKS:

1. Pulse and Digital Circuits-A. Anand Kumar, PHI, 2005.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI, 1987.
3. Modern Digital Electronics - RP Jain - 4/e - TMH, 2010.
4. Digital Fundamentals - Floyd and Jain, Pearson Education, 8th Edition, 2005.

DIGITAL CIRCUITS

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54006	Core	L	T	P	C	CIE	SEE	Total
		2	1	0	3	40	60	100

Prerequisite: ANALOG DEVICES & CIRCUITS

Course Objectives

This course provides in-depth knowledge of digital logic and its Verilog representation. Which is the basis for design of any digital circuit. The main objectives are:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand basics of Boolean algebra and minimization using k-maps
3. To implement simple logical operations using combinational logic circuits.
4. To implement simple logical operations using sequential logic circuits.
5. To understand the concepts of sequential machines, enabling to analyze sequential systems in terms of state machines.

UNIT 1

NUMBER SYSTEMS AND CODES: Number systems, Conversions of number systems, signed, unsigned numbers and complements -1's, 2's, 9's and 10's. Binary arithmetic: addition, subtraction.Binary weighted and non-weighted codes, BCD addition and subtraction, Error detecting and error correcting codes.

INTRODUCTION TO VERILOG HDL: Verilog as HDL, Levels of Design Description, Simulation & Synthesis, Language Constructs.

UNIT II

BOOLEAN ALGEBRA: Logic gates, Postulates and theorems: representation of switching functions, SOP and POS, Karnaugh map representations, minimization using k-maps- upto 4 variables.

UNIT III

COMBINATIONAL CIRCUITS: Introduction, Design procedure**,** Half-Adder, Full-Adder, Half- Subtractor, Full-Subtractor, Encoder, Decoder, multiplexer, de-multiplexer, code converters-binary to gray, gray to binary, BCD to excess-3 and excess-3 to BCD, Comparator, 4 bit adder/Subtractor, Introduction to PLD's, Logic implementation using PAL & PLA.

UNIT IV

SEQUENTIAL CIRCUITS: Introduction, Design procedure, memory elements: latch & flip-flops- SR, D, JK, T, race around condition-Master-Slave JK FF, Flip-Flop operating characteristics, flip-flop conversions, Design of synchronous sequential circuits: binary counters- up, down, up-down, MOD counters, other counters-Ring and Johnson, Shift registers- SISO, SIPO, PISO, PIPO, Universal shift register.

UNIT V

SEQUENTIAL MACHINES: Melay and Moore machines, state equivalence and machine minimization- partitioning approach.
INTRODUCTION TO DIGITAL IC's- Classification, two input standard TTL NAND&NOR-analysis, tri-state TTL.

TEXT BOOKS

1. Digital Logic Computer Design – By M. Morris Mano, PHI.1979
2. Digital Logic Design Principles – By Norman Balbamian and Breadly, John Wiley,2001.
3. S. Palnitkar, "Verilog HDL – A Guide to Digital Design and Synthesis", Pearson, 2003.
4. Digital Fundamentals - Floyd and Jain, Pearson Education,8th Edition, 2005.

REFERENCES

1. Introduction to Switching Theory and Logic Design- By F. J. Hill and Peterson, John Wiley Publications,1974.
2. Digital Logic – Applications & Design – By- John M. Yarbroough, Vikas Publications, 1997.
3. Digital Systems Principles, Applications– By Ronald J. Tocci, Pearson Education/Phil,2011.
4. Switching And Finite Automata Theory – By Zvi Kohavi, TMH Edition,3rd edition, 2009.
5. VerilogHDL Primer -By J.Bhasker BSpublications 2008.

Course Outcomes

After completing the course, students should be able to

1. Understand numeric information in different forms, e.g. different bases, signed integers, various codes such as Gray and BCD.
2. Understand Boolean algebra, minimization of Boolean functions.
3. Design combinational circuits by using building blocks.
4. Design sequential circuits by using sequential functions/building blocks.
5. Design and analyze the circuits using Finite state machines and minimization of state machines.

ELECTRONIC CIRCUIT ANALYSIS

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54021	Core	L	T	P	C	CIE	SEE	Total
		3	0	0	3	40	60	100

Prerequisite: ELECTRONIC DEVICES AND CIRCUITS

Course objectives

1. To classify the single stage amplifiers and to understand the distortion in amplifiers and to analyse the amplifiers at Low Frequencies using Approximate Hybrid Model.
2. To learn the concepts of frequency response and analyse the BJT and MOS Amplifiers at Low and High Frequencies. To analyse the CE amplifier with SC current gain and resistive loads at High frequencies using Hybrid-Pi Model.
3. To classify and Analyse the multistage amplifiers.
4. To classify the Large signal amplifiers and determine the efficiency of each one.
5. To classify and analyse the Tuned amplifiers and Oscillators.

UNIT I

SINGLE STAGE AMPLIFIERS : Classification Of Amplifiers, Distortion In Amplifiers, Analysis Of CB, CE And CC Amplifiers Using Exact and Approximate Hybrid Model, Millers Theorem And Its Dual, Design Of CE Amplifier.

UNIT II

FREQUENCY RESPONSE OF BJT AND MOS AMPLIFIERS -: Frequency Response of BJT and MOS Amplifiers, Analysis At Low And High Frequencies. Hybrid Pi Model of BJT and MOS, CE Short Circuit Current Gain, Alpha, Beta Cut-Off Frequencies.

UNIT III

MULTI STAGE AMPLIFIERS: Different Coupling Schemes Used In Amplifiers- RC Coupled Amplifiers, Transformer Coupled Amplifiers And Direct Coupled Amplifiers. Analysis Of Cascaded RC Coupled BJT Amplifiers, Cascode Amplifiers, Darlington Pair, Effect of cascading on Gain and Bandwidth.

UNIT IV

LARGE SIGNAL AMPLIFIERS: Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifiers, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Cross-Over Distortion, Heat Sinks.

UNIT V

TUNED AMPLIFIERS AND OSCILLATORS: Classification of Tuned Amplifiers, Quality Factor, Analysis of Single Tuned Amplifiers. OSCILLATORS: Conditions for oscillations, Principle of operation: RC Oscillators (RC Phase Shift Oscillator and Wein Bridge Oscillator), LC Oscillators (Hartley Oscillator and Colpitts Oscillator) and Crystal Oscillator.

TEXT BOOKS:

1. Fundamentals of Micro Electronics by Behzad Razavi, 2nd ed.,2013, Wiley.
2. Electronic devices and circuits - -S.Salivahana, N. Suresh kumar, A vallavaraj, 2nd ed.,2011.
3. Integrated electronic- Jacob Millman & Christor C Halkias, 2 ed.,2008, TMH.

REFERENCES

1. Introductory electronic devices and circuits- Robert T. Paynter, 7th ed.,2009, Pearson Education India.
2. Electronic circuit analysis- K.Lal Kishore , 2004, BSP Publication.
3. Electronic devices & circuit David A Bell-5th ed,.Oxford university press,1999.
4. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.

Course outcomes

After completing the course, students should be able to

1. Design and analyse the single stage amplifiers at Low Frequencies using Approximate Hybrid Model.
2. Analyze the BJT Amplifiers at High Frequencies using Hybrid –Pi Model and determine α and β cutoff frequencies.
3. Describe the importance of Multi stage amplifiers and to analyze them to find frequency parameters.
4. Explain the application of Large signal amplifier and the usage of heat sinks.
5. Analyze the effect of cascading Single tuned and double tuned amplifiers on Bandwidth and understand the stability of the tuned amplifiers.

ELECTRONIC CIRCUIT ANALYSIS LAB

B. Tech II Year II Semester					Dept. of Information Technology			
Code	Category	Hours / Week			Credits	Marks		
A54211	Core	L	T	P	C	CIE	SEE	Total
		0	0	2	1	50	50	100

List of Experiments (12 Experiments to be done)

Course Objectives

1. To design and test the various amplifier circuits.
2. To understand the operation of the amplifier circuits by plotting the frequency response curve.
3. To operate and test the feedback amplifier circuits and interpret the results.
4. To generate the signals for the desired frequency using oscillator circuits.
5. To operate the large signal amplifiers and find the efficiency.

I. Design verification using Simulation tools (Any 6 Experiments)

1. Common Emitter Amplifier.
2. Common Base Amplifier.
3. Two Stage RC Coupled Amplifier.
4. Colpitts Oscillator.
5. Cascode Amplifier.
6. Wien Bridge Oscillator using Transistors.
7. RC Phase Shift Oscillator using Transistors.
8. Class A Power Amplifier (transformer less).
9. Class B Complementary Symmetry Amplifier.
10. Common Gate (JFET) Amplifier.

II. Testing in the Hardware Laboratory (6 Experiments)

A) Any Three circuits simulated in simulation laboratory

B) Any Three of the following

1. Class A Power Amplifier (with transformer load)
2. Class C Power Amplifier.
3. Single Tuned Voltage Amplifier.
4. Hartley Oscillators.
5. Darlington Pair.
6. Common Collector Amplifier.

Requirements

1. For software simulation of Electronic circuits.
   (i) Computer System with latest specifications.
   (ii) Connected in LAN (Optional)
   (iii) Operating system (Windows XP)
   (iv) Suitable Simulations Software.

2. For Hardware simulations of Electronic Circuits
   (i) Regulated Power Supply (0-30V)
   (ii) CRO's

(iii) Function Generators
(iv) Millimeters
(v) Components.

Course outcomes

After completing the course, students should be able to

1. Design and test various amplifier circuits and to find the gain.
2. Calculate the lower and upper 3 dB frequencies and Bandwidth of the amplifier circuits.
3. Design and test the feedback amplifier circuits and interpret the results.
4. Design and test the oscillator circuits and interpret the results.
5. Design and test the large signal amplifier circuits and interpret the results.

PULSE & INTEGRATED CIRCUITS LAB

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54212	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. To design the various wave shaping circuits.
2. To demonstrate generation of various non-sinusoidal waveforms.
3. To analyze the operational amplifiers, timers and their applications in electrical and electronics circuits.
4. To acquire the knowledge on Digital IC families, its specifications and applications.
5. To distinguish linear and digital ICs for different applications

Minimum 12 experiments to be conducted:

List of Experiments

PART –I DESIGN VERIFICATION OF THE FOLLOWING CIRCUITS.

1. Linear wave shaping. (Using LabVIEW/Multisim software)
2. Non-Linear wave shaping- Clippers. (Using LabVIEW/Multisim software)
3. Non-Linear wave shaping –Clampers. (Using LabVIEW/Multisim software)
4. Transistor as a switch. (Using LabVIEW/Multisim software)
5. Astable Multivibrator.
6. Monostable Multivibrator.
7. Bistable Multivibrator.
8. Sampling gates

PART –II TO VERIFY THE FOLLOWING FUNCTIONS USING IC 741, IC 555, 74 SERIES TTL IC'S, CMOS IC'S

1. Adder, Subtractor, Comparator using IC 741 Op-Amp.
2. Integrator and Differentiator using IC 741 Op-Amp.
3. Active Low Pass & High Pass Butterworth (second order).
4. IC 555 timer in Monostable operation.
5. Schmitt trigger circuits using IC 741 & IC 555
6. 4 bit comparator 74LS85.
7. 8X1 Multiplexer- 74151 and 2X4 Demultiplexer-74155.
8. 3-8 decoder – 74LS138.
9. D Flip (74LS74) and JK Master-Slave Flip-Flop (74LS73).
10. Decade counter (74LS90) and UP –Down Counter (74LS192).
11. Universal Shift registers – 74LS194/195.

Equipment required for Laboratories

1. Regulated Power Supply - 0-30 V
2. CRO - 0-20 M Hz
3. Function Generators - 0- 1 M Hz
4. Components
5. Multimeters

Course Outcomes

1. After completing the course, students should be able to
2. Design linear and nonlinear wave shaping circuits.
3. Create various waveforms such as Square, Pulse and Sweep.
4. Design electronic switch.
5. Use of operational Amplifier (IC 741).
6. Design circuits using operational amplifiers for various applications.
7. Design various combinational circuits using various Digital Integrated IC's.
8. Describe the differences between Linear and Digital Integrated IC's.
    -

DIGITAL CIRCUITS SIMULATION LAB

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54213	Core	L	T	P	C	CIE	SEE	Total
		0	0	3	1.5	50	50	100

Course Objectives

1. To learn basic digital circuit equipment.
2. To design and verify basic gates.
3. To implement combinational logic circuits.
4. To implement sequential logic circuits.
5. To design and verify FSM

I. Design all the experiment and verify by using hardware Trainer kits/equipment (Any Six)

1. Introduction to Digital Laboratory equipment and tools
2. Design basic gates and verify their truth tables.
3. Design and implement a multiplexer.
4. Design and implement encoder and decoder
5. Design a Half adder, full adder & verify its truth table.
6. Design and construct basic flip-flops.
7. Design and construct of 4bit binary Counter.
8. Design and construct universal 4-bit shift register.
9. Finite State Machine design

II. Write a Verilog HDL for any 8 experiments and simulate the same using Cad tools.

1. Verilog HDL code to realize all the logic gates.
2. Verilog HDL code to realize 3 to 8 decoder and 8 to 3 encoder.
3. Verilog HDL code to realize 8 to 1 multiplexer and 1 to 8 demultiplexer. .
4. Verilog HDL code to realize a half adder, full adder.
5. Verilog HDL code to realize 4 bit comparator.
6. Verilog HDL code to realize basic flip-flops.
7. Verilog HDL code to realize a 4-bit binary Counter.
8. Verilog HDL code to realize a universal 4-bit shift register.
9. Design and Implementation of Digital Lock.
10. Design and Implementation of Traffic Light controller.
11. Design and Implementation of 4 Bit ALU.
12. Design and Implementation of Vending Machine.

Requirements

1. Hardware Trainer Kits
2. FPGA Trainer Kits
3. Computer System with latest specifications
4. Software HDL Verilog (Xilinx- Vivado)

Course Outcomes

After completing the course, students should be able to

1. Explain the basic digital circuit equipment.
2. Design and verify basic gates.
3. Implement combinational logic circuits.
4. Implement sequential logic circuits.
5. Design and verify FSM

GENDER SENSITIZATION

B. Tech II Year II Semester					Dept. of Electronics & communications			
Code	Category	Hours / Week			Credits	Marks		
A54022	Core	L	T	P	C	CIE	SEE	Total
		2	0	0				

Course Objectives

Course Objectives of Gender Sensitization are to:

1. Develop student's sensibility with regard to issues of gender in contemporary India
2. Provide a critical perspective on the socialization of men and women.
3. Introduce students to information about some key biological aspects of genders
4. Expose the students to debates on the politics and economics of work.
5. Help students reflect critically on gender violence.

Course Outcomes

1. At the end of the Gender Sensitization course, students will be able to:
2. Develop a better understanding of important issues related to gender in contemporary India.
3. Identify the 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.
4. Analyze a finer grasp of how gender discrimination works in our society and how to counter it.
5. Acquire insight into the gendered division of labour and its relation to politics and economics.
6. Men and women students and professionals will be better equipped to work and live together as equals.

UNIT I

Understanding Gender: Gender: Why should we study it? (Towards a world of equals: Unit-1)
Socialization: Making Women, Making Men (Towards a world of equals: Unit-2)
Introduction, Preparing for womanhood. Growing up male. First lesson in caste. Different Masculinities. Just Relationships: Being Together as Equals (Towards a world of equals: Unit-12)
Mary Kom and Onler. Love and acid just do not mix. Love Letters. Mothers and Fathers. Further reading: Rosa Parks-The Brae Heart.

UNIT II

Gender And Biology: Missing Women: Sex Selection and its Consequences (Towards a world of equals: Unit-4)
Declining Sex Ration. Demographic Consequences.
Gender Spectrum: Beyond The Binary (Towards a world of equals: Unit-10)
Two or many? Struggles with Discrimination.
Additional Reading: Our Bodies, Our Health (Towards a world of equals: Unit-13)

UNIT III

Gender And Labour: Housework: The invisible Labour (Towards a world of equals: Unit-3)
"May Mother doesn't work". "Share the Load". Women's work: its politics and economics (Towards a world of equals: Unit-7)
Fact and Fiction. Unrecognized and unaccounted work. Further Reading: Wages and Conditions of Work.

UNIT IV

Issues Of Violence: Sexual Harassment: Say No! (Towards a world of equals: Unit-6)
Sexual Harassment, not Eve-teasing-coping with everyday Harassment-Further Reading: "Chupulu". Domestic Violence: Speaking out (Towards a world of equals: Unit-8)
Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading: New Forums for Justice. Thinking about sexual Violence (Towards a world of equals: Unit-11)
Blaming the Victim- "I Fought for my life….." – Further reading: The Caste Face of Violence.

UNIT V

Gender Studies: Knowledge: Through the lens of gender (Towards a world of equals: Unit-5)
Point of View. Gender and the Structure of Knowledge. Further Reading: unacknowledged Women artists of Telangana.
Whose History? Questions for Historians and others (Towards a world of equals: Unit-9)
Reclaiming a past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

TEXT BOOKS

1. A. Suneetha, Uma Bhrugubanda, Duggirala Vasantha, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deep Sreenivas and Susie Tharu, " Towards a world of Equals; A Bilingual Textbook on Gender"
2. Sen, Amartya. "More than one million Women are Missing". New York review of books 37.20 (20 December 1990). Print. 'We Were Making History….' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women 1989.

REFERENCES

1. Tripti Lahari. "By the numbers: Where Indian Women Work. "Women's studies journal (14 November 2012) Available online at: http://blogs.wsj.com/indiarealtime/2012/11/14/by the numbers where Indian women work.
2. K. Satyanarayana & Susie Tharu (ed.) Steel are sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada
http://herpercollins.co.in/Bookdetail.asp? Book _code = 3732.
3. Monon, Nivedita, Seeing like a Feminist, New Delhi: Zubaan-Penguin Bokks, 2012.
4. Virginia Woolf: A Room of One's Own. Oxford: Black swan. 1992.