COURSE STRUCTURE
AND
DETAILED SYLLABUS

for

II B.TECH

ELECTRONICS AND
COMMUNICATION ENGINEERING

(Applicable for the batches admitted from 2016-17)

GURU NANAK INSTITUTIONS
TECHNICAL CAMPUS
(An Autonomous Institution)
Campus: Ibrahimpatnam, R.R. District – 501 506

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS (AUTONOMOUS)

CONTENTS

Sl. No.	Sub. Code	Particulars /Name of the Subject	Page No.
1.		**COURSE STRUCTURE**	3

II YEAR I SEMESTER

II YEAR II SEMESTER

GNI GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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COURSE STRUCTURE

II. B. Tech. Electronics and Communication Engineering

II Year   I SEMESTER (ECE)

Subject Code	Group	Subject	L	T	P	Credits
HM0311	BS	Mathematics - III	4	0	0	4
EC0341	PC	Signals and Systems	4	1	0	4
EC0312	PC	Principles of Electrical Engg. (PEE)	4	0	0	4
ECO342	PC	Analog Electronics	4	0	0	4
EE0328	BS	Probability Theory & Stochastic Processes	4	1	0	4
GN0391	HS	Gender Sensitization Lab	-	-	-	-
EC0343	PC	Analog Electronics Lab-I	0	0	3	1
EE0323	PC	Electrical Technology Lab	0	0	3	2
EC0321	ES	Basic Simulation Lab	0	0	3	1
		Total Credits				**24**

II Year   II SEMESTER (ECE)

Subject Code	Group	Subject	L	T	P	Credits
EC0441	PC	Switching Theory and Logic Design	3	1	0	3
EC0442	PC	Pulse and Digital Circuits	3	1	0	3
EC0443	PC	Electromagnetic Theory and Transmission Lines	4	0	0	4
EC0444	PC	Analog Communications	3	1	0	3
EE0428	PC	Control Systems	3	1	0	3
EC0445	PC	Analog Communications Lab	0	0	3	2
EC0446	PC	Pulse and Digital Circuits Lab	0	0	3	2
EC0447	PC	Analog Electronics Lab-II	0	0	3	2
GN0492	HS	Human Values and Professional Ethics	2	0	0	2
		Total Credits				**24**

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II Year B. Tech. I Sem

L	T	P	C
4	0	0	4

(HM0311) MATHEMATICS-III

Objectives:
- To enable the students to understand the concepts of probability distributions, statistical Inferences, and testing of hypothesis.
- To enable the students to understand the key concepts of Complex functions and the calculus of complex functions.

Outcomes:
- The student achieves the knowledge to testing the hypothesis and forms the probability distributions to make inferences.
- The students can study some problems of engineering using the concepts of residue theorem, Laurent series of functions of complex variables.

Syllabus:
UNIT-I: Single Random variables and probability distributions.
Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution.
Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance.

UNIT-II: Multiple Random variables, Correlation & Regression
Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III: Sampling Distributions and Testing of Hypothesis
Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and varience, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of varience.
Parameter estimations – likelihood estimate, interval estimations.
Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, and Level of significance. One sided test, Two sided test,
Large sample tests:
(i)   Test of Equality of means of two samples equality of sample mean and population mean (cases of known varience & unknown varience, equal and unequal variances)
(ii)   Tests of significance of difference between sample S.D and population S.D.
(iii)   Tests of significance difference between sample proportion and population proportion & difference between two sample proportions

Small sample tests:
Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples
Snedecor's F- distribution and it's properties. Test of equality of two population variances
Chi-square distribution , it's properties, Chi-square test of goodness of

UNIT-IV: Functions of Complex Variables
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 – Cauchy's integral formula – Generalized integral formula.
Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity

UNIT – V: Contour Integration
Residue – Evaluation of residue by formula and by Laurent series – Residue theorem.
Evaluation of integrals of the type
(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

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 .

Text Books:
1) Fundamentals of mathematical statistics by s c gupta and v.k.kapoor
2) Probability and statistics for engineers and scientists by sheldon m.ross,academic press
3) Probability and statistics for engineering and the science by jay l.devore.
4) Higher engineering mathematics by b s grewal.
5) Advanced engineering mathematics by peter v o'neil, cengage learning
6) Engineering mathematics by erwin kreyszig,10th edition wiely publications

References:
1) Mathematics for engineers series –probability statistics and stochastic process by k.b.datta and m.a s.srinivas,cengage publications
2) Probability, statistics and stochastic process by prof.a r k prasad., wiely india
3) Advanced engineering mathematics by sahanaz bathul, phi publication
4) Probability and statistics by t.k.v.iyengar &b.krishna gandhi etel
5) Mathematics for engineers series- advanced mathematics for engineers by k.b.datta and m.a s.srinivas, cengage publications
6) Advanced engineering mathematics for engineers by prof.a r k prasad., wiely india

II Year B. Tech. I Sem

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(EC0341)SIGNALS AND SYSTEMS

Prerequisite: Nil

Objectives:
- This gives the basics of Signals and Systems required for all Electrical Engineering related courses.
- This gives concepts of Signals and Systems and its analysis using different transform techniques.
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Outcomes:
Upon completing his course, the student will be able to
- Represent any arbitrary analog or Digital time domain signal in   frequency domain.
- Understand the importance of sampling, sampling theorem and its   effects.
- Understand the characteristics of linear time invariant systems.
- Determine the conditions for distortion less transmission through a   system.
- Analyze CT and DT systems using Laplace transforms and Z Transforms.

Syllabus:
Unit I: Signal Analysis and Fourier Series
Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.
Fourier Series : Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

Unit II: Fourier Transforms and Sampling
Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.
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, Introduction to Band Pass sampling.

Unit III: Signal Transmission through Linear Systems
Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Linear Time Variant (LTV) System, 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, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and Rise time.

Unit IV: Convolution and Correlation of Signals
Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation function and Energy/Power spectral density

Unit V: Laplace Transforms and Z-Transforms
Review of Laplace Transforms (L.T.), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T., Relation between L.T. and F.T. of a signal, Laplace Transform of certain signals using waveform synthesis.

Z-Transforms : Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, Concept of Z-Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

Text Books:
1. Signals, Systems & Communications – B.P. Lathi, 2013, BSP
2. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2ed. PHI.

References:
1. Signals & Systems – Simon Haykin and Van Veen, Wiley, 2 Ed.
2. Signals and Signals – Iyer and K. Satya Prasad, Cengage Learning
3. Signals and Systems – A. Rama Krishna Rao – 2008, TMH.
4. Introduction to Signal and System Analysis – K. Gopalan 2009, CENGAGE Learnings.

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II Year B. Tech. ECE I-Sem

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(EE0362) Principles of Electrical Engineering

Pre-requisite: Nil

Objectives: Objectives of this course are
- To Know the basic principle of DC Generators and motors.
- To Know the basic principle of Single Phase Transformers.
- To Understand the basic principle of three-phase induction motor and alternators.
- To understand the basic principle of special motors and electrical instruments.

Outcomes: After this course, the student
- To analyze the performance of DC generators and motors.
- To analyze the performance of Transformers.
- To learn the in-depth knowledge on three phase induction motors.
- To analyze the performance of special motors and electrical instruments in real time applications.

Syllabus:

UNIT I

D.C Generators and DC Motors: Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators, DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT II

Transformers & Performance: Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit, Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

Induction Motor: Principle of operation of single-phase induction motors –Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

Special Motors & Electrical Instruments: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors

UNIT -III

Steady state and transient analysis of RC, RL and RLC Circuits, Circuits with switches, step response, 2nd order series and parallel RLC Circuits, Root locus, damping factor,

over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves

Network Analysis using Laplace transform techniques, step, impulse and exponential excitation, response due to periodic excitation, RMS and average value of periodic waveforms.

UNIT -IV

Two port network parameters, Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros.

UNIT V

Standard T, π, L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network, T and π Conversion, LC Networks and Filters: Properties of LC Networks, Foster's Reactance theorem, design of constant K, LP, HP and BP Filters, Composite filter design.

Text Books:
1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000

References:
1. Principles of Electrical Engineering - V.K Mehta, S.Chand Publications.
2. Theory and Problems of basic electrical engineering - I.J. Nagarath amd D.P Kothari, PHI   Publications
3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin
4. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 5th Edition, 1993.
5. Network Analysis and Synthesis – N.C.Jagan and C.Lakshminarayana, B.S. Publications, 2004.

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II Year B. Tech. ECE I-Sem	L	T	P	C
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(EC0342) ANALOG ELECTRONICS

Pre Requisites: Basic Electrical and Electronics Engineering.

Objectives:
- To introduce circuit realizations with components such as diodes, BJTs and transistors studied earlier.
- To give understanding of various types of amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
- To familiarize the Concept of feedback in amplifiers so as to differentiate between negative and positive feedback.

Outcomes:
Upon completion of the Course, the students will be able to :
- Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
- Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
- Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
- Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations.

Syllabus:
UNIT – I: ANALYSIS AND DESIGN OF SMALL SIGNAL LOW FREQUENCY BJT AMPLIFIERS
Classification of Amplifiers – Distortion in amplifiers, Analysis of CE, CC, and CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors, Design of single stage RC coupled amplifier Different coupling schemes used in amplifiers, Analysis of Cascaded RC Coupled amplifiers, Cascode amplifier, Darlington pair, Frequency response of BJT amplifier – Analysis at low and high frequencies, The Hybrid- pi (π) – Common Emitter transistor model, CE short circuit current gain, current gain with resistive load, single stage CE transistor amplifier response, Gain-bandwidth product

UNIT – II: FET AMPLIFIERS
Analysis of JFET Amplifiers, Analysis of CS, CD, CG JFET Amplifiers, comparison of performance with BJT Amplifiers, Basic Concepts of MOS Amplifiers, –MOSFET – MOSFET Characteristics in Enhancement and Depletion mode – MOS Small signal model, Common source amplifier with resistive, Diode connected and Current source

loads, Source follower, Common Gate Stage, Cascode and Folded Cascode Amplifier – frequency response.

UNIT –III: POSITIVE & NEGATIVE FEEDBACK IN AMPLIFIERS

Classification of amplifiers, Concepts of feedback – Classification of feedback amplifiers – General characteristics of negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations – Simple problems.

Condition for oscillations. RC and LC type Oscillators – Frequency and amplitude stability of oscillators – Generalized analysis of LC oscillators, Quartz, Hartley, and Colpitts Oscillators – RC-phase shift and Wien-bridge oscillators.

UNIT – IV:
LARGE SIGNAL AMPLIFIERS

Class A Power Amplifier, Maximum Value of Efficiency of Class – A Amplifier, Transformer Coupled Amplifier, Push Pull and Complimentary Symmetry Class B and Class AB Power Amplifiers – Principle of operation of class –C Amplifier, Transistor Power Dissipation, Heat Sinks.

UNIT – V:
TUNED AMPLIFIERS

Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading single Tuned amplifiers on Bandwidth, Effect of Cascading Double Tuned amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned amplifiers

Text Books:
1. Electronic Devices and Circuits, David A. Bell – 5th Edition, Oxford.
2. Electronic Devices and Circuits, S. Salivahanan, N.Suresh Kumar, A Vallvaraj, 2nd Edition, TMH.

References:
1. Integrated Electronics, Jacob Millman, Christos C Halkias, TMH
2. Introductory Electronic Devices and Circuits (Conventional flow version) – Robert T. Paynter, 7th Edition, 2009, PEI.
3. Microelectronic Circuits – Sedra / Smith – 5th Edition – Oxford, 2009
4. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.
5. Electronic Devices and Circuits, Anil.K. Maini, Varsha Agrawal, 1st Edition, WILEY.
6. Electronic Devices and Circuit Theory, Robert L.Boylestad, Louis Nashelsky, 9th Edition, Pearson Education.
7. Electronic Devices and Circuits – 2nd Edition by Muhammad H.Rashid, Cengage Learning.

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

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(EE0328) PROBABILITY THEORY AND STOCHASTIC PROCESSES

Syllabus:
Unit I: Probability
Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events.

Unit II: Random Variable
Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous andMixed Random Variables, Distribution and Density functions and their Properties - Binomial, Poisson, Uniform,Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event,Conditional Density, Properties.
Operation on One Random Variable Expectations
Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Non monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

Unit III: Multiple Random Variables
Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density, Point Conditioning, Conditional Distribution and Density, Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem (Proof not expected), Unequal Distribution, Equal Distributions.
Operations on Multiple Random Variables
Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, and Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, and Linear Transformations of Gaussian Random Variables.

Unit IV: Stochastic Processes – Temporal Characteristics

The Stochastic Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Concept of Stationary and Statistical Independence, First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, Nth Order and Strict-Sense Stationarity, Time Averagesand Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and itsProperties, Cross-Correlation Function and its Properties, Covariance and its Properties, Linear SystemResponse of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions, GaussianRandom Processes, Poisson Random Process.

Stochastic Processes - Spectral Characteristics

Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function,Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power SpectralDensity of Input and Output of a Linear System.

Unit V: Noise

Types of Noise: Resistive (Thermal) Noise Source, Shot noise, Extra terrestrial Noise, Arbitrary Noise Sources, White Noise, Narrowband Noise: In phase and Quadrature phase components and its Properties, Modeling of Noise Sources, Average Noise Bandwidth, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4 ed., 2001, TMH.
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 ed., TMH.

Refrences:

1. . Principles of Communication systems – H.Taub, Donald.L.Schilling, Goutam Saha, 3 ed., 2007, TMH.
2. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001

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

(GN0391) GENDER SENSITIZATION LAB
(An Activity-based Course)

Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary 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.

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.

Syllabus:
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 lessons in Caste. Different Masculinities.

UNIT – II: GENDER AND BIOLOGY
 Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)
Two or Many? Struggles with Discrimination.

UNIT – III: GENDER AND LABOUR
Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)
"My 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. Additional 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. Additional Reading: New Forums for Justice.
Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)
 Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT – V: GENDER : CO-EXISTENCE
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. Additional Reading: Rosa Parks-The Brave Heart.

Essential Reading: All the Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.
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.

References:

1. 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.

2. Tripti Lahiri. "By the Numbers: Where Indian Women Work*." Women's Studies Journal* (14 November 2012) Available online at: http:// blogs.wsj.com/ India real time/2012/11/14/by –the-numbers-where-Indan-women-work/>

3. K. Satyanarayana and Susie Tharu (Ed.) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier 2: Telugu And Kannada http://harpercollins.co.in/BookDetail.asp?Book_Code=3732

4. Vimala. "Vantillu (The Kitchen)". *Women Writing in India: 600 BC to the Present. Volume II*: The 20th Century. Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 599-601.

5. Shatrughna, Veena et al. *Women's Work and its Impact on Child Health and Nutrition*, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research. 1993.

6. Stree Shakti Sanghatana. *"We Were Making History ….' Life Stories of Women in the Telangana People's Struggle*. New Delhi: Kali for Women, 1989.

7. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012

8. Jayaprabha, A. "Chupulu (Stares)". *Women Writing in India: 600BC to the Present. Volume II*: The 20th Century Ed. Susie Tharu and K. Lalita. Delhi: Oxford University Press, 1995. 596-597.

9. Javeed, Shayan and Anupam Manuhaar. "Women and Wage Discrimination in India: A Critical Analysis." *International Journal of Humanities and Social Science Invention* 2.4(2013)

10. Gautam, Liela and Gita Ramaswamy. "A 'conversation' between a Daughter and a Mother." *Broadsheet on Contemporary Politics.* Special Issue on *Sexuality and Harassment: Gender Politics on Campus Today*. Ed. Madhumeeta Sinha and Asma Rasheed. Hyderabad: Anveshi Research Center for Women's Studies, 2014.

11. Abdulali Sohaila. "*I Fought For My Life…and Won*."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

12. Jeganathan Pradeep, Partha Chatterjee (Ed). "*Community, Gender and Violence Subaltern Studies XI*". Permanent Black and Ravi Dayal Publishers, New Delhi, 2000

13. K. Kapadia. The *Violence of Development: The Politics of Identity, Gender and Social Inequalities in India.* London: Zed Books, 2002

14. S. Benhabib. *Situating the Self: Gender, Community, and Postmodernism in Contemporary Ethics,* London: Routledge, 1992

15. Virginia Woolf. *A Room of One's Own.* Oxford: Black Swan. 1992.

16. T. Banuri and M. Mahmood, *Just Development: Beyond Adjustment with a Human Face,* Karachi: Oxford University Press, 1997

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II Year B. Tech. ECE I-Sem

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(EC0343) ANALOG ELECTRONICS LAB – I

Syllabus:
List of Experiments (Twelve experiments to be done):
Design (any six) and Simulation (any Ten) using Multisim or Pspice or Equivalent Simulation Software:

1.   Common Emitter Amplifier

2.   Common Base Amplifier

3.   Common Source amplifier

4.   Two Stage RC Coupled Amplifier

5.   Current Shunt and Voltage Series Feedback Amplifier

6.   Cascode Amplifier

7.   Wien Bridge Oscillator using Transistors

8.   RC Phase Shift Oscillator using Transistors

9.   Class A Power Amplifier (Transformer less)

10.   Class B Complementary Symmetry Amplifier

11.   Hartley and Colpitt's Oscillator

12.   Single Tuned Voltage Amplifier

Equipments required for Laboratories:
1. For software simulation of Electronic circuits
    i)   Computer Systems with latest specifications
    ii)   Connected in LAN (Optional)
    iii)   Operating system (Windows XP)
    iv)   Simulations software (Multisim / TINAPRO) Package
2. For Hardware simulations of Electronic Circuits
    i)   RPSs
    ii)   CROs
    iii)   Functions Generators
    iv)   Multimeters
    v)   Components

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II Year B. Tech. ECE I-Sem　　　　　　　　　　　　　　**L　T　P　C**
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(EE0323) ELECTRICAL TECHNOLOGY LAB

PART – A

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.

PART – B

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. *OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).*
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method.

Note: Any TEN of the above experiments are to be conducted

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE I-Sem

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(EC0321) BASIC SIMULATION LAB

Note:
- All the experiments are to be simulated using MATLAB or equivalent software
- Minimum of 15 experiment 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, Sinc.
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 parts of Signal.
5. Convolution for Signals and sequences.
6. Auto Correlation and Cross Correlation for Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI system and verifying its physical realiazability and stability properties.
9. Gibbs Phenomenon Simulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value and its Skew, Kurtosis, and PSD, Probability Distribution Function.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.
18. Checking a Random Process for Stationarity in Wide sense.

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(AUTONOMOUS)

II Year B. Tech. ECE II-Sem **L T P C**
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(EC0441) SWITCHING THEORY AND LOGIC DESIGN

Pre Requisites: Nil

Objectives:
This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:
- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To impart to student the concepts of sequential circuits, enabling them to analyze sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

Outcomes:
Upon completion of the course, students should possess the following skills:
- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

Syllabus:
UNIT-I:
Number System and Boolean Algebra And Switching Functions: Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.
Boolean Algebra: Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

UNIT-II:
Minimization and Design of Combinational Circuits:
Introduction, The Minimization of switching function using theorem, The Karnaaugh Map Method-Up to Five Variable Maps, Don't Care Map Entries, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, Demultiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III:
Sequential Machines Fundamentals and Applications:
Introduction: Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop , Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.
Registers and Counters: Shift Registers, Data Transmission in Shift Registers, Operation of Shift Registers, Shift Register Configuration, Bidirectional Shift Registers, Applications of Shift Registers, Design and Operation of Ring and Twisted Ring Counter, Operation Of Asynchronous And Synchronous Counters.

UNIT-IV:
Sequential Circuits-I:
Introduction, State Diagram, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Synthesis of Synchronous Sequential Circuits, Serial Binary Adder, Sequence Detector, Parity-bit Generator, Design of Asynchronous Counters, Design of Synchronous Modulo N – Counters.

UNIT-V:
Sequential Circuits-II:
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods-concept of minimal cover table.
Algorithmic State Machines: Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

Text Books:
1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge.
2. Switching Theory and Logic Design – A Anand Kumar, PHI,2013.

References:
1. Digital Design- Morris Mano, PHI, 3rd Edition.

2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
3. Digital Fundamentals – A Systems Approach – Thomas L. Floyd, Pearson, 2013.
4. Digital Logic Design - Ye Brian and HoldsWorth, Elsevier
5. Fundamentals of Logic Design- Charles H. Roth, Cengage LEanring, 5th, Edition, 2004.
6. DigitalLogic Applications and Design- John M. Yarbrough, Thomson Publications, 2006.
7. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE II-Sem

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3 1 0 3

(EC0442)PULSE AND DIGITAL CIRCUITS

Prerequisite: Analog Electronics

Objectives:
- To explain the complete response of R-C and R-L-C transient circuits.
- To explain clippers, clampers, switching characteristics of transistors and sampling gates.
- To construct various multivibrators using transistors, design of sweep circuits and sampling gates.
- To discuss and realize logic gates using diodes and transistors.

Outcomes:
At the end of the course, the student will be able to:
- Understand the applications of diode as integrator, differentiator, clippers, clampler circuits..
- Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates
- Design mutivibrators for various applications, synchronization techniques and sweep circuits.
- Realizing logic gates using diodes and transistors.
- Understanding of time and frequency domain aspects.
- Importance of clock pulse and its generating techniques.

Syllabus:
UNIT-I:
Linear Wave Shaping: High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Attenuators and its application as a CRO Probe, RL and RLC Circuits and their response for Step Input ,Ringing Circuit.

UNIT-II:
Non-Linear Wave Shaping: Diode clippers, Transistor clippers, Clipping at two independent levels, Comparators, Applications of Voltage comparators. Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem, Practical Clamping Circuits, Effect of Diode Characteristics on Clamping Voltage, Synchronized Clamping.

UNIT-III:

Switching Characteristics of Devices: Diode as a Switch, Piecewise Linear Diode Characteristics, Diode Switching times, Transistor as a Switch, Break down voltages, Transistor in Saturation, Temperature variation of Saturation Parameters, Transistor-switching times, Silicon-controlled-switch circuits.

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

UNIT–IV:

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

Time Base Generators: General features of a Time base Signal, Methods of Generating Time Base Waveform, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators, 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, Sine wave frequency division with a Sweep Circuit, A Sinusoidal Divider using Regeneration and Modulation.

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, DCTL, RTL, DTL, TTL and CML Logic Families and its Comparison.

Text Books:

1. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., 2008, TMH.
2. Solid State Pulse Circuits –David A. Bell, 4 Ed., 2002 PHI.

References:

1. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.
2. Fundamentals of Pulse and Digital Circuits- Ronald J. Tocci, 3 Ed., 2008.
3. Pulse and Digital Circuits – Motheki S. Prakash Rao, 2006, TMH.
4. Wave Generation and Shaping - L. Strauss.
5. Pulse, Switching and Digital Circuits – 5th Edition, David A. Bell, Oxford, 2015.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE II-Sem   **L T P C**
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(EC0443) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Prerequisite : Nil

Objectives:

This is a structured foundation course, dealing with concepts, formulations and applications of Electromagnetic Theory and Transmission Lines, and is the basic primer for all electronic communication engineering subjects. The main objectives of the course are …

- To learn the Basic Laws, Concepts and proofs related to Electrostatic Fields and Magnetostatic Fields, and apply them to solve physics and engineering problems.
- To distinguish between static and time-varying fields, and understand the significance and utility of Maxwell's Equations and Boundary Conditions, and gain ability to provide solutions to communication engineering problems.
- To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.
- To conceptually understand the UPW Polarization features and Poynting Theorem, and apply them for practical problems.
- To determine the basic Transmission Line Equations and telephone line parameters and estimate the distortions present.
- To understand the concepts of RF Lines and their characteristics, Smith Chart and its applications, acquire knowledge to configure circuit elements, QWTs and HWTs, and to apply the same for practical problems.

Outcomes : Having gone through this foundation course, the students would be able to …

- Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
- Analyze the Wave Equations for good conductors and good dielectrics, and evaluate the UPW Characteristics for several practical media of interest.
- Establish the proof and estimate the polarization features, reflection and transmission coefficients for UPW propagation, distinguish between Brewster and Critical Angles, and acquire knowledge of their applications.
- Determine the Transmission Line parameters for different lines, characterize the distortions and estimate the characteristics for different lines.
- Analyze the RF Line features and configure them as SC, OC Lines, QWTs and HWTs, and design the same for effective impedance transformation.

- Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems.

Syllabus:
UNIT–I:
Electrostatics: 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 Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Illustrative Problems.

UNIT–II:
Magnetostatics: Biot-Savart's Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Illustrative Problems.
Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements, Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces, Illustrative Problems .

UNIT–III:
EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization, Illustrative Problems.
EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem – Applications, Illustrative Problems.

UNIT–IV:
Transmission Lines - I: Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading, Illustrative Problems.

UNIT–V:
Transmission Lines – II: Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; $\lambda/4$, $\lambda/2$, $\lambda/8$ Lines – Impedance

Transformations, Significance of Z_{min} and Z_{max}, Smith Chart – Configuration and Applications, Single Matching, Illustrative Problems.

Text Books:
1. Principles of Electromagnetics – Matthew N.O. sadiku and S.V. Kulkarni, 6th Ed., Oxford University Press, Aisan Edition, 2015.
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:
1. Engineering Electromagnetics – Nathan Ida, 2nd Ed., 2005, Springer (India) Pvt. Ltd., New Delhi.
2. Networks, Lines and Fields – John D. Ryder, 2nd Ed., 1999, PHI.
3. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 7th Ed., 2006, TMH.

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(AUTONOMOUS)

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II Year B. Tech. ECE II-Sem | 3 | 1 | 0 | 3 |

(EC0444) ANALOG COMMUNICATIONS

Prerequisite : Signals and Systems

Objectives:

- To develop ability to analyze system requirements of analog communication systems.
- To understand the need for modulation
- To understand the generation, detection of various analog modulation techniques and also perform the mathematical analysis associated with these techniques.
- To acquire knowledge to analyze the noise performance of analog modulation techniques.
- To acquire theoretical knowledge of each block in AM and FM receivers.
- To understand the pulse modulation techniques.

Outcomes:

- Able to analyze and design various modulation and demodulation analog systems.
- Understand the characteristics of noise present in analog systems.
- Study of signal to Noise Ration (SNR) performance, of various   Analog Communication systems.
- Analyze and design the various Pulse Modulation Systems.
- Understand the concepts of Multiplexing : Time Division   Multiplexing (TDM) and Frequency Division Multiplexing (FDM).

Syllabus:
UNIT I AMPLITUDE MODULATION
Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT II SSB MODULATION
Introduction to Hilbert Transform, Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves.

Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT III ANGLE MODULATION

Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

UNIT IV NOISE

Resistive Noise Source (Thermal), Arbitrary Noise Sources, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties Noise in Analog communication System, Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis and de-emphasis.

UNIT V RECEIVERS

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

PULSE MODULATION

Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Divison Multiplexing.

Text Books:
1. Communication Systems by Simon Haykins John Wiley & Sons , 4th Edition.
2. Electronic Communications – Dennis Roddy and John Coolean , 4th Edition , PEA, 2004
3. Communication Systems – B.P. Lathi, BS Publication , 2004.
4. Electronics & Communication System – George Kennedy and Bernard Davis , TMH 2004.

References:
1. Electronic Communication Systems – Modulation and Transmission - Robert J. Schoenbeck, 2nd Edition, PHI.
2. Analog and Digital Communications – Simon Haykin, John Wiley, 2005.
3. Analog and Digital Communication – K. Sam Shanmugam, Willey ,2005
4. Electronics Communication Systems-Fundamentals through Advanced-Wayne Tomasi, 5th Edition,2009,PHI.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE II-Sem

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(EE0428) CONTROL SYSTEMS

Pre-requisite: Network Analysis

Objectives: Objectives of course are
- To introduce the principles and applications of control systems in everyday life
- To introduce the basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems
- To understand different aspects of stability analysis of systems in frequency domain and time domain.

Outcomes: After this course, the student gets a thorough knowledge of
- Open loop and closed loop control systems.
- Modeling and transfer function derivations of translational and rotational systems.
- Represent transfer functions through block diagrams and signal flow graphs.
- Design a control systems using time domain and frequency domain techniques.
- Time response analysis, stability analysis, frequency response analysis of different ordered systems through their characteristic equation and time-domain specifications.
- Applications of concepts to electrical and electronics problems.

Syllabus:
UNIT – I INTRODUCTION:
Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.
Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems.

TRANSFER FUNCTION EPRESENTATION:
Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-II TIME RESPONSE ANALYSIS:
Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain

specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – III STABILITY ANALYSIS:
The concept of stability - Routh stability criterion – qualitative stability and conditional stability.

Root Locus Technique:
The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

Frequency Response Analysis:
Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT-IV STABILITY ANALYSIS IN FREQUENCY DOMAIN:
Polar Plots, Nyquist Plots and applications of Nyquist criterion to find the stability – Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

Classical Control Design Techniques:
Compensation techniques – Lag, Lead, and Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT – V STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS:
Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and its Properties.

Text Books:
1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.
2. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

References:
1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
3. Control Systems Engg. by NISE 3rd Edition – John wiley
4. Control Systems by S.Kesavan , Hitech Publications.
5. "Modeling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE II-Sem   **L   T   P   C**
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(EC0445) ANALOG COMMUNICATIONS LAB

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

1. Amplitude modulation and demodulation.

2. DSB-SC Modulator & Detector

3. SSB-SC Modulator & Detector (Phase Shift Method)

4. Frequency modulation and demodulation.

5. Study of spectrum analyzer and analysis of AM and FM Signals

6. Pre-emphasis & de-emphasis.

7. Time Division Multiplexing & De multiplexing

8. Frequency Division Multiplexing & De multiplexing

9. Verification of Sampling Theorem

10. Pulse Amplitude Modulation & Demodulation

11. Pulse Width Modulation & Demodulation

12. Pulse Position Modulation & Demodulation

13. Frequency Synthesizer.

14. AGC Characteristics.

15. PLL as FM Demodulator

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

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

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(EC0446) PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

1. Linearwave Shaping
    a. RC Low Pass Circuit for different time constants
    b. RC High Pass Circuit for different time constants

2. Non-linear wave shaping
    a. Transfer characteristics and response of Clippers:
        i)   Positive and Negative Clippers
        ii)   Clipping at two independent levels
    b. The steady state output waveform of clampers for a square wave input
        i)   Positive and Negative Clampers
        ii)   Clamping at different reference voltage

3. Comparison Operation of different types of Comparators

4. Switching characteristics of a transistor

5. Design a Bistable Multivibrator and draw its waveforms

6. Design an Astable Multivibrator and draw its waveforms

7. Design a Monostable Multivibrator and draw its waveforms

8. Response of Schmitt Trigger circuit for loop gain less than and greater than one

9. UJT relaxation oscillator

10. The output- voltage waveform of Boot strap sweep circuit

11. The output- voltage waveform of Miller sweep circuit

12. Pulse Synchronization of An Astable circuit

13. Response of a transistor Current sweep circuit

14. Sampling gates

    a. Response of Unidirectional gate

    b. Response of Bidirectional gate using transistors

15. Study of logic gates

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

II Year B. Tech. ECE II-Sem   **L T P C**
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(EC0447) ANALOG ELECTRONICS LAB – II

List of Experiments (Twelve experiments to be done):

Hardware Testing in Laboratory:
Part A: Minimum of 6 out of the 10 experiments listed on breadboard.

1. Current Shunt Feedback amplifier

2. Voltage Series Feedback amplifier

3. Cascode amplifier

4. Darlington Pair

5. RC Phase shift Oscillator

6. Hartley and Colpitt's Oscillators

7. Class A power amplifier

8. Class B Complementary symmetry amplifier

Part B: Testing of any 2 circuits designed and simulated out of the 4 experiments listed.

1. Common Emitter Amplifier

2. Common Source Amplifier

3. Two Stage RC Coupled Amplifier

4. Wien Bridge Oscillator using Transistors

Part C:

1. Introduction to PCB fabrication methods

2. Translation of any tested/designed and tested circuits on a PCB.

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(AUTONOMOUS)

II Year B. Tech. II-Sem.
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(GN0492) HUMAN VALUES AND PROFESSIONAL ETHICS

Prerequisite: Nil

Objectives:
1. To introduce the basic concepts of universal human values
2. To familiarize the students with desirable business and professional ethics, rights and responsibilities
3. To prepare students against possible gaps and unethical practices in contemporary times
4. To sensitize the students so that they can protect themselves and the organization from the possible professional crime malpractices

Outcomes:
1. The students learn about diverse ethical issues rooted in society, trade, business, and environment on local as well as a global platform.
2. The students appreciate their role as a responsible citizen, professional, and as managers, advisors, experts and consultants.
3. The students will reflect and learn major values and ethics from their observations of a spiritual discourse and a visit to a business organization as a practical part of this course.

Syllabus:
Unit I Human Values: Morals, values, ethics – integrity – work ethics –service learning –civic virtue – respect for others- living peacefully - Caring –sharing –honesty – courage –valuing time – cooperation – commitment –empathy – self-confidence –spirituality – character- Mini-Cases

Unit II Professional Ethics: Profession- and professionalism - Two models of professionalism –Professional etiquette -Three types of Ethics or morality Responsibility in Engineering – Engineering standards –Engineering Ethics – Positive and Negative Faces. Professional Codes and Code of conduct of Institute of Engineers. Mini-cases.

Unit III Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis– congeniality, collegiality and loyalty. Respect for authority – conflicts of interest –Mini-Cases.

Unit IV Professional Rights: professional rights and employee rights communicating risk and public policy – Whistle blowing - Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership- Regulatory compliances, Monitoring and control- Mini-Cases

Unit V Ethics in global context: Global issues in MNCs- Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts – paternalism – different business practices – negotiating taxes. Mini-Cases.

Mini-projects
Project 1: The student of this course should invariably attend (or watch on internet/any TV channel/youtube/social media) two speeches of 30 minutes duration each dealing with spiritual discourse and submit a report on the contents of the lecture proceedings.

Project 2: Visit any organization (including shops/ hotels or shopping malls in your region) of your choice and observe how the professionals perform the given job with a focus on professional ethics and human values.

References
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