II B.Tech. I Semester
ECE SYLLABUS

II B.Tech. ECE SYLLABUS STRUCTURE

II B.Tech I Sem ECE :

S. No.	Category	Subject Name	Subject Code	L	T	P	Credits
1	BS & H	Probability theory and stochastic process	V231210421	3	0	0	3
2	HSMC	Universal Human Values – Understanding Harmony and Ethical Human Conduct	V23121CC11	2	1	0	3
3	Engineering Science	Signals and Systems	V2312104L1	3	0	0	3
4	Professional Core	Electronic Devices and Circuits	V231210431	3	0	0	3
5	Professional Core	Switching Theory and Logic Design	V231210432	3	0	0	3
6	Professional Core	Electronic Devices and Circuits Lab	V231210461	0	0	3	1.5
7	Professional Core	Switching Theory and Logic Design Lab	V231210462	0	0	3	1.5
8	Skill Enhancement course	Data Structures using Python	V231210471	0	1	2	2
9	Audit Course	Environmental Science	V23121CCC1	2	0	0	-
Total				16	2	8	20

II B.Tech II Sem ECE :

S. No.	Category	Subject Name	Subject Code	L	T	P	Credits
1	Management Course-I	Managerial Economics and Financial Analysis	V23122C4M1	2	0	0	2
2	Engineering Science / Basic Science	Linear Control Systems	V2312204L1	3	0	0	3
3	Professional Core	Electromagnetic Waves and Transmission Lines	V231220431	3	0	0	3
4	Professional Core	Electronic Circuit Analysis	V231220432	3	0	0	3
5	Professional Core	Analog Communications	V231220433	3	0	0	3
6	Professional Core	Signal and Systems Lab	V231220461	0	0	3	1.5
7	Professional Core	Electronic Circuit Analysis lab	V231220462	0	0	3	1.5
8	Skill Enhancement course	Soft Skills	V231220471	0	1	2	2
9	Engineering Science	Design Thinking & Innovation	V23122CCL2	1	0	2	2
Total				15	1	10	21
Mandatory Community Service Project Internship of 08 weeks duration during summer vacation							

II Year-I Semester		L	T	P	C
		3	0	0	3

PROBABILITY THEORY AND STOCHASTIC PROCESS (V231210421)

Course Objectives:

- This gives basic understanding of random variables and operations that can be performed on them.
- To know the Spectral and temporal characteristics of Random Process.
- To Learn the Basic concepts of Information theory Noise sources and its representation for understandingits characteristics

Students will be able to

Course Outcomes:

CO1: Perform operations on single and multiple Random variables

CO2: Determine the Spectral and temporal characteristics of Random Signals

CO3: Characterize LTI systems driven by stationary random process by using ACFs and PSDs.

CO4: Understand the concepts of Noise

UNIT- I Probability & Random Variable:
Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events, Random Variable- Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT-II Operations on Single & Multiple Random Variables–Expectations:
Expected Value of a Random Variable, Function of a Random Variable, Variance and Skew, Chebychev's Inequality, Characteristic Function, Transformations of a Random Variable: Monotonic and Non- monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable. Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density–Point Conditioning, Conditional Distribution and Density
– Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected).Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions.

UNIT-III Random Processes–Temporal Characteristics:

The Random Process Concept, Classification of Processes, Deterministic and Non deterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First- Order Stationary Processes, Second Order and Wide-Sense Stationarity, (N^{th}-Order) and Strict- Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT-IV Random Processes–Spectral Characteristics:

The Power Spectrum: Properties, Relationship between Power Spectrum and Auto correlation Function, TheCross-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 Density Spectrums of Input and Output.

UNIT- V Noise Sources:

Resistive / Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalentbandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise,

TEXTBOOKS:

1. Peyton Z. Peebles-Probability, Random Variables & Random Signal Principles, 4^{th} Ed, TMH, 2001.
2. Taub and Schilling-Principles of Communication systems,TMH,2008

REFERENCE BOOKS:

1. Bruce Hajck –Random Processes for Engineers, Cambridge unipress,2015
2. Athanasios Papoulis and S. Unni krishna Pillai - Probability, Random Variables and StochasticProcesses,4thEd.,PHI,2002.
3. B.P.Lathi- Signals, Systems & Communications, B.S.Publications,2003.
4. S.P Eugene Xavier -Statistical Theory of Communication, New Age Publications, 2003.

II Year-I Semester		L	T	P	C
		2	1	0	3
UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY ANDETHICAL HUMAN CONDUCT (V23121CC11)					

Course Objectives:

- To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holisticperspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Course Outcomes:

- Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
- Identify one's self, and one's surroundings (family, society nature) (L1, L2)
- Apply what they have learnt to their own self in different day-to-day settings in real life (L3)
- Relate human values with human relationship and human society. (L4)
- Justify the need for universal human values and harmonious existence (L5)
- Develop as socially and ecologically responsible engineers (L3, L6)

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1-hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I Introduction to Value Education (6 lectures and 3 tutorials for practicesession)
Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture 2: Understanding Value Education
Tutorial 1: Practice Session PS1 Sharing about Oneself Lecture 3: self-exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – the Basic Human Aspirations
Tutorial 2: Practice Session PS2 Exploring Human Consciousness

Lecture 5: Happiness and Prosperity – Current Scenario Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial 3: Practice Session PS3 Exploring Natural Acceptance

UNIT II Harmony in the Human Being (6 lectures and 3 tutorials for practice session) Lecture 7:

Understanding Human being as the Co-existence of the self and thebody.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self andbody.
Lecture 9: The body as an Instrument of the selfLecture 10:
Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the selfLecture 11:
Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and Health
Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

UNIT III Harmony in the Family and Society (6 lectures and 3 tutorials for practicesession)
Lecture 13: Harmony in the Family – the Basic Unit of Human InteractionLecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of TrustLecture 15:
'Respect' – as the Right Evaluation
Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect Lecture 16:
Other Feelings, Justice in Human-to-Human RelationshipLecture 17:
Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV Harmony in the Nature/Existence (4 lectures and 2 tutorials for practicesession)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment amongthe Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of NatureLecture 21:
Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence.

UNIT V Implications of the Holistic Understanding – a Look at Professional Ethics (6lectures and 3 tutorials for practice session)
Lecture 23: Natural Acceptance of Human Values Lecture 24:
Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution andUniversal Human Order

Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession Tutorial 14: Practice Session PS14 Exploring Steps of Transition towardsUniversal Human Order

Practice Sessions for UNIT I – Introduction to Value EducationPS1 Sharing about Oneself
PS2 Exploring Human ConsciousnessPS3 Exploring Natural Acceptance
Practice Sessions for UNIT II – Harmony in the Human BeingPS4
Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the selfPS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and SocietyPS7 exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature (Existence)PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at ProfessionalEthics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:

Textbook and Teachers Manual

a. The Textbook

R R Gaur, R Asthana, G P Bagaria, *A Foundation Course in Human Values and Professional Ethics*,2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

b. The Teacher's Manual

R R Gaur, R Asthana, G P Bagaria,*Teachers' Manual for A Foundation Course in Human Values andProfessional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

1. *JeevanVidya: EkParichaya*, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. *Human Values*, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. *The Story of Stuff* (Book).
4. *The Story of My Experiments with Truth* - by Mohandas Karamchand Gandhi
5. *Small is Beautiful* - E. F Schumacher.
6. *Slow is Beautiful* - Cecile Andrews

II Year-I Semester		L	T	P	C
		3	0	0	3

SIGNALS AND SYSTEMS (V2312104L1)

Course Objectives:

- To study about signals and systems.
- To analyze the spectral characteristics of signal using Fourier series and Fourier transforms.
- To understand the characteristics of systems.
- To introduce the concept of sampling process
- To know various transform techniques to analyze the signals and systems.

Course Outcomes:

At the end of this course the student will able to:

CO 1: Differentiate the various classifications of signals and systems

CO 2: Analyze the frequency domain representation of signals using Fourier concepts

CO 3: Classify the systems based on their properties and determine the response of LTI Systems.

CO 4: Know the sampling process and various types of sampling techniques.

CO 5: Apply Laplace and z-transforms to analyze signals and Systems (continuous & discrete).

UNIT- I: INTRODUCTION: Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. 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, related problems.

UNIT–II: FOURIER SERIES AND FOURIER TRANSFORM:

Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Exponential Fourier series, Relation between Trigonometric and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function, introduction to Hilbert Transform, related problems.

UNIT-III: ANALYSIS OF LINEAR SYSTEMS:

Introduction**,** Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system, Related problems. Filter characteristics of linear systems. Distortion less transmission through a system, Signal band width, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between band width and rise time.

UNIT–IV:

CORRELATION:

Auto-correlation and cross-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between Convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

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, Related problems.

UNIT–V:

Z–TRANSFORMS:

Concept of Z - Transform of a discrete sequence. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms. Distinction between Laplace, Fourier and Z-transforms.

TEXT BOOKS:

1. Signals, Systems & Communications -B.P.Lathi, BSPublications,2003.
2. Signals and Systems A.V.Oppenheim,A.S.WillskyandS.H.Nawab,PHI,2nd Edn,1997
3. Signals & Systems-Simon Haykin and VanVeen,Wiley,2ndEdition,2007

REFERENCE BOOKS:

1. Principles of Linear Systems and Signals – BP Lathi, Oxford UniversityPress,2015
2. Signals and Systems –TK Rawat, Oxford University press, 2011

II Year-I Semester		L	T	P	C
		3	0	0	3

ELECTRONIC DEVICES AND CIRCUITS (V231210431)

Course Objectives:

- To learn and understand the basic concepts of semiconductor physics.
- Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
- To learn and understand the application of diodes as rectifiers with their operation and characteristics with and without filters are discussed.
- Acquire knowledge about the principle of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics.
- To learn and understand the purpose of transistor biasing and its significance.
- Small signal equivalent circuit analysis of BJT and FET transistor amplifiers and compare different configurations.

Course Outcomes:

CO 1: Apply the basic concepts of semiconductor physics.
CO 2: Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
CO 3: Analyze the construction, working principle of Semiconductor Devices and Diode Circuits.
CO 4: Know the need of transistor biasing, various biasing techniques for BJT and FET andstabilization concepts with necessary expressions.
CO 5: Design small signal low frequency transistor amplifier circuits using BJT and FET in different configurations

UNIT-I:

Review of Semiconductor Physics: Mobility and Conductivity, Intrinsic and extrinsic semiconductors**,** Hall Effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors. **(Text book: 1)**

Junction Diode Characteristics: Energy band diagram of PN junction Diode, Open circuited **p-** n junction, Biased p-n junction, p-n junction diode, current components in p-n junction Diode, Diode equation, V-I Characteristics, Temperature dependence on V-I characteristics, Diode resistance, Diode capacitance.**(Text book: 1)**

UNIT-II:

Special Semiconductor Devices: Zener Diode, Breakdown mechanisms, Zener diode applications, Varactor Diode, LED, Photodiode, Tunnel Diode, UJT, PNPN Diode, SCR, Construction, operation and V-I characteristics. **(Text book: 1)**

Diode Circuits: The Diode as a circuit element, The Load-Line concept, The Piecewise Linear Diode model, Clipping (limiting) circuits, Clipping at Two Independent Levels, Peak Detector, Clamping circuits, Comparators, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, Filters, Inductor filter, Capacitor filter, π-section Filter, comparison of various filter circuits in terms of ripple factors. **(Text book: 1, 2)**

UNIT-III:

Transistor Characteristics: Junction transistor, transistor current components, transistor equation in CB configuration, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, Photo

transistor, typical transistor junction voltage values. **(Textbook:1)**

Transistor Biasing and Thermal Stabilization : Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in V_{BE}, Ic, and β, Stability factors, (S,S$^{'}$,S$^{''}$), Bias compensation, Thermal runaway, Thermal stability. **(Text book: 1)**

UNIT-IV:

Small Signal Low Frequency Transistor Amplifier Models:

BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, Analysis of CB, CE and CC amplifiers using exact and approximate analysis, Comparison of transistor amplifiers. **(Text book: 1, 2)**

UNIT- V:

FET: FET types, JFET operation, characteristics, small signal model of JFET. **(Text book: 1)**

MOSFET: MOSFET Structure, Operation of MOSFET: operation in triode region, operation in saturation region, MOSFET as a variable resistor, derivation of V-I characteristics of MOSFET, Channel length modulation, MOS trans conductance.

MOS device models: MOS small signal model, PMOS Transistor, CMOS Technology, Comparison of Bipolar and MOS devices. **(Text book: 3)**

CMOS amplifiers: General Considerations, Common Source Stage, Common Gate Stage, Source Follower, comparison of FET amplifiers. **(Text book: 3)**

Text Books:

1. Millman's Electronic Devices and Circuits- J. Millman, C. C. Halkias and Satyabratajit, Mc-Graw Hill Education, 4th edition, 2015.
2. Millman's Integrated Electronics - J.Millman, C.Halkias and Ch.D.Parikh, Mc-GrawHill Education, 2nd Edition, 2009.
3. Fundamentals of Microelectronics – Behzad Razavi, Wiley, 3rdedition, 2021.

References:

1. Basic Electronics - Priciples and Applications, Chinmoy Saha, Arindam Halder, Debarati Ganguly, Cambridge University Press.
2. Electronics Devices & Circuit Theory – Robert L.Boylestad and Loui Nashelsky, Pearson, 11th edition, 2015.
3. Electronic Devices and Circuits – David A. Bell, Oxford University Press, 5thedition,2008.
4. Electronic Devices and Circuits - S.Salivahanan, N.Suresh Kumar, Mc - Graw Hill, 5th Edition, 2022.

II Year-I Semester		L	T	P	C
		3	0	0	3

SWITCHING THEORY AND LOGIC DESIGN (V231210432)

Course Objectives:

- To solve a typical number base conversion and analyze new error coding techniques.
- Theorems and functions of Boolean algebra and behavior of logic gates
- To optimize logic gates for digital circuits using various techniques.
- Boolean functions Simplification using Karnaugh maps and Quine – Mc Cluskey methods
- To understand concepts of combinational circuits.
- To develop advanced sequential circuits.

Course Outcomes:

CO 1: Classify different number systems and apply to generate various codes.
CO 2: Use the concept to Boolean algebra in minimization of switching functions.
CO 3: Design different types of combinational logic circuits.
CO 4: Apply knowledge of flip-flops in designing of Registers and counters.
The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
CO 5: Produce innovative designs by modifying the traditional design techniques.

UNIT–I

REVIEW OF NUMBER SYSTEMS & CODES:
Representation of numbers of different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed members. Gray code, 4 bit codes; BCD, Excess-3, 2421, 84-2-1code etc. Error detection & correction codes: parity checking, even parity, odd parity, Hamming code.

BOOLEAN THEOREMS AND LOGIC OPERATIONS:

Boolean theorems, principle of complementation & duality, De-Morgan Theorems. Logic operations: Basic logic operations - NOT, OR, AND, Universal Logic operations, EX-OR, EX-NOR operations. Standard SOP and POS Forms, NAND-NAND and NOR-NOR realizations, Realization of three level logic circuits.

UNIT–II

MINIMIZATION TECHNIQUES:
Minimization and realization of switching functions using Boolean theorems, K-Map(upto 6 variables) and tabular method(Quine-Mc Cluskey method) with only four variables and single function.

COMBINATIONAL LOGIC CIRCUITS DESIGN:

Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders; 4 -bit adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit and carry look-a- head adder circuit, Design code converts using Karnaugh method and draw the complete circuit diagrams.

UNIT–III

COMBINATIONALLOGICCIRCUITSDESIGN USINGMSI&LSI :
Design of encoder, decoder, multiplexer and de-multiplexers, Implementation of higher order circuits using lower order circuits. Realization of Boolean functions using decoders and multiplexers. Design of Priority encoder, 4-bit digital comparator and seven segment decoder.
INTRODUCTION OF PLD's: PROM, PAL, PLA-Basics structures, realization of Boolean functions, Programming table.

UNIT –IV

SEQUENTIALCIRCUITS I:

Classification of sequential circuits (synchronous and asynchronous), operation of NAND & NOR Latches and flip-flops, truth tables and excitation tables of RS flip-flop, JK flip- flop, T flip-flop, D flip-flop with reset and clear terminals. Conversion from one flip-flop to another flip-flop. Design of 5 ripple counters, design of synchronous counters, Johnson counter, ring counter. Design of registers - Buffer register, control buffer register, shift register, bi-directional shift register, universal shift, register

Study the following relevant ICs and the irrelevant functions 7474,7475,7476,7490,7493,74121.

UNIT –V

SEQUENTIAL CIRCUITS II:

Finite state machine; state diagrams, state tables, reduction of state tables. Analysis of clocked sequential circuits Mealy to Moore conversion and vice-versa. Realization of sequence generator, Design of Clocked Sequential Circuit to detect the given sequence (with overlapping or without overlapping)

TEXTBOOKS:

1. Switching and finite automata theory Zvi KOHAVI, Niraj. K.Jha 3rd Edition, Cambridge University Press, 2009.
2. Digital Design by M.Morris Mano, Michael DCiletti,4th edition PHI publication, 2008
3. Switching theory and logic design by Hill and Peterson**,** Mc-Graw Hill TMH edition, 2012.

REFERENCES:

1. Fundamentals of Logic Design by Charles H.Roth Jr,Jaico Publishers, 2006.
2. Digital electronics by RSSedha. S.Chand & company limited, 2010
3. Switching Theory and Logic Design by A.Anand Kumar, PHI Learning PVT Ltd, 2016.
4. Digital logic applications and design by John MYarbough, Cengage learning, 2006.
5. TTL74-Series data book.

II Year - I Semester		L	T	P	C
		0	0	3	1.5

ELECTRONIC DEVICES AND CIRCUITS LAB (V231210461)

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

Course Objectives:

- To be exposed to the characteristics of basic electronic devices diodes, transistors etc.,
- Model the electronic circuits using tools such as PSPICE

Course Outcomes:

CO1 : Analyse the characteristics of BJT
CO2 : Understand the Characteristics of UJT
CO3 : Categorizing the characteristics of different electronic devices such as diodes, transistors etc., and simple circuits like rectifiers, amplifiers etc.,
CO4 : Measure voltage, frequency and phase of any waveform using CRO.
CO5 : Executing the programs by using Spice tool

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. Clipper circuit using diode
2. Clamping circuit using diode
3. Rectifiers(without and with C-filter)
   Part A: Half-wave Rectifier
   Part B: Full-wave Rectifier
4. BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: Output Characteristics
5. FET Characteristics (CS Configuration)
   Part A: Drain Characteristics
   Part B: Transfer Characteristics
6. SCR Characteristics
7. UJT Characteristics
8. Transistor Biasing
9. CRO Operation and its Measurements
10. BJT - CE Amplifier
11. Emitter Follower- CC Amplifier
12. FET - CS Amplifier

Equipment required:

1. Regulated Power supplies
2. Analog / Digital Storage Oscilloscopes
3. Analog / Digital Function Generators
4. Digital Multi-meters
5. Decade Resistance Boxes / Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

II Year - I Semester		L	T	P	C
		0	0	3	1.5

SWITCHING THEORY AND LOGIC DESIGN LAB (V231210462)

Course Objectives:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To design combinational logic circuits, sequential logic circuits.
- To understand common forms of number representation in digital electronic circuits To be able to convert between different representations.

Course Outcomes:

CO 1: Discuss about digital logic gates and their properties.
CO 2: Identify the importance of SOP and POS canonical forms in the minimization or other optimization of Boolean formulas in general and digital circuits.
CO 3: Analyze the design procedures of Combinational & sequential logic circuits.
CO 4: Design different types of Counters and circuits

List of Experiments:

1. Verification of truth tables of the following Logic gates
   Two input (i) OR (ii) AND (iii) NOR (iv) NAND (v) Exclusive-OR (vi) Exclusive-NOR
2. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
3. Verification of functional table of 3to8-line Decoder / De-multiplexer
4. 4 variable logic function verification using 8 to 1 multiplexer.
5. Design full adder circuit and verify its functional table.
6. Verification of functional tables of
   (i) JK Edge triggered Flip–Flop (ii) JK Master Slave Flip– Flop (iii) D Flip-Flop
7. Design a four – bit ring counter using D Flip–Flops / JK Flip Flop and verify output.
8. Design a four-bit Johnsons counter using D Flip-Flops / JK Flip Flops and verify output
9. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
10. Draw the circuit diagram of MOD-8 ripple counter and construct a circuit using T-Flip-Flops and Test It with a low frequency clock and sketch the output waveforms.
11. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
12. (a) Draw the circuit diagram of a single bit comparator and test the output
    (b) Construct 7 Segment Display Circuit Using Decoder and 7 Segment LED and test it.

Additional Experiments:

1. Design BCD Adder Circuit and Test the Same using Relevant IC
2. Design Excess-3 to 9-Complement convertor using only four Full Adders and test the Circuit.
3. Design an Experimental model to demonstrate the operation of 74154 De-Multiplexer using LEDs for outputs.
4. Design of any combinational circuit using Hardware Description Language
5. Design of any sequential circuit using Hardware Description Language

II Year - I Semester		L	T	P	C
		0	1	2	2
DATA STRUCTURES USING PYTHON LAB (V231210463)					

Course Objectives:

- Understand Basic data structures in python like Strings, Characters, Float, Boolean, Lists, Tuples, Dictionaries, Sets and Maps
- Design and analyze simple linear data structures
- Identify and apply the suitable data structure for the given real -world problem
- Design and analyze non-linear data structures
- Gain knowledge in practical applications of data structures

Course Outcomes:

CO 1: Apply the Proficiency in handling numbers. Strings, and Functions to solve Computational Problems.
CO 2: Design and develop solution for real-time application using database operations
CO 3: Apply string, functions and exception handling for solving diverse problems
CO 4: Implement various data structures (such as list, dictionary, tuple, set) and its operations
CO 5: Classify different data structures such as stack, queues, linked list, trees and graphs
CO 6: Implement various operations on linear and non-linear data structures

List of Experiments:

1. Write a Python program for class, Flower, that has three instance variables of type str, int, and float that respectively represent the name of the flower, its number of petals,and its price. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type, and retrieving the value of each type.
2. Develop an inheritance hierarchy based upon a Polygon class that has abstract methods area( ) and perimeter( ). Implement classes Triangle, Quadrilateral, Pentagon, that extend this base class, with the obvious meanings for the area( ) and perimeter( ) methods. Write a simple program that allows users to create polygons of the various types and input their geometric dimensions, and the program then outputs their area and perimeter
3. Write a python program to implement Method Overloading and Method Overriding.
4. Write a Python program to illustrate the following comprehensions: a) List Comprehensions b) Dictionary Comprehensions c) Set Comprehensions d) Generator Comprehensions
5. Write a Python program to generate the combinations of n distinct objects taken from the elements of a given list. Example: Original list: [1, 2, 3, 4, 5, 6, 7, 8, 9] Combinations of 2 distinct objects: [1, 2] [1, 3] [1, 4] [1, 5] [7, 8] [7, 9] [8, 9].
6. Write a program for Linear Search and Binary search.
7. Write a program to implement Bubble Sort and Selection Sort.
8. Write a program to implement Merge sort and Quick sort.

9. Write a program to implement Stacks and Queues.
10. Write a program to implement Singly Linked List.
11. Write a program to implement Doubly Linked list.
12. Write a program to implement Binary Search Tree.

II Year-I Semester		L	T	P	C
		2	0	0	-

AUDIT COURSE : ENVIRONMENTAL SCIENCE (V23121CCC1)

Course Objectives:

- To make the students to get awareness on environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life
- To save earth from the inventions by the engineers.

Course Outcomes:

CO1 Grasp multi disciplinary nature of environmental studies and various renewable and non-renewable resources.

CO2 Understand flow and bio-geo- chemical cycles and ecologicalpyramids.

CO3 Understand various causes of pollution and solid waste management and related preventive measures.

CO4 Understand the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.

CO5 Illustrate the causes of population explosion, value education andwelfare programmes.

UNIT – I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance –Need for Public Awareness.

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use andexploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT – II

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation : Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-

sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situand Ex-situ conservation of biodiversity.

UNIT – III

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT – IV

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products.

– Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT – V

Human Population And The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health –Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban / Rural / Industrial / Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Textbooks:

1. Erach Bharucha,Text book of Environmental Studies for Undergraduate Courses,Universities Press (India) Private Limited, 2019.
2. Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
3. S.Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
4. K.Raghavan Nambiar, “Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus”, SciTech Publications (India), Pvt. Ltd, 2010.

Reference Books:

1. Deeksha Dave and E.Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M.Anji Reddy, “Textbook of Environmental Sciences and Technology”, BSPublication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering,Prentice Hall of India Private limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc23_hs155/preview
- https://www.edx.org/learn/environmental-science/rice-university-ap-r- environmental-science-part-3-pollution-and- resources?index=product&objectID=course-3a6da9f2-d84c-4773-8388-1b2f8f6a75f2&webview=false&campaign=AP%C2%AE+Environmental+Science+ +Part+3%3A+Pollution+and+Resources&source=edX&product_category=course& placement_url=https%3A%2F%2Fwww.edx.org%2Flearn%2Fenvironmental-science
- http://ecoursesonline.iasri.res.in/Courses/Environmental%20Science-I/Data%20Files/pdf/lec07.pdf
- https://www.youtube.com/watch?v=5QxxaVfgQ3k

II B.Tech. II Semester
ECE SYLLABUS

II Year - II Semester		L	T	P	C
		2	0	0	2
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (V23122C4M1)					

Course Objectives:

- To inculcate the basic knowledge of microeconomics and financial accounting
- To make the students learn how demand is estimated for different products, input-output relationship for optimizing production and cost
- To Know the Various types of market structure and pricing methods and strategy
- To give an overview on investment appraisal methods to promote the students to learnhow to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparingfinancial statements.

Course Outcomes:

CO 1: Define the concepts related to Managerial Economics, financial accounting and management

CO 2:Understand the fundamentals of Economics viz., Demand, Production, cost,revenue and markets

CO 3: Apply the Concept of Production cost and revenues for effective Business decision

CO 4: Analyze how to invest their capital and maximize returns

CO 5: Evaluate the capital budgeting techniques.

Develop the accounting statements and evaluate the financial performance of businessentity

UNIT – I:

Managerial Economics

Introduction – Nature, meaning, significance, functions, and advantages. Demand-Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting-Factors governing Forecasting, Methods. Managerial Economics and Financial Accounting and Management.

UNIT – II:

Production and Cost Analysis

Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and long run Production Function- Isoquantsand Is costs, Cost & Break-Even Analysis - Cost concepts and Cost behaviour- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

UNIT – III:

Business Organizations and Markets

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT – IV:
Capital Budgeting

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements. Capital Budgeting– Features, Proposals, Methods and Evaluation. Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (sample problems)

UNIT – V:
Financial Accounting and Analysis

Introduction – Concepts and Conventions- Double-Entry Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability.

Textbooks:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH.

Reference Books:

1. Ahuja Hl Managerial economics Schand.
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, NewAge International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e,New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage.

Online Learning Resources:

https://www.slideshare.net/123ps/managerial-economics-ppt
https://www.slideshare.net/rossanz/production-and-cost-45827016
https://www.slideshare.net/darkyla/business-organizations-19917607
https://www.slideshare.net/balarajbl/market-and-classification-of-market
https://www.slideshare.net/ruchi101/capital-budgeting-ppt-59565396
https://www.slideshare.net/ashu1983/financial-accounting

II Year - II Semester		L	T	P	C
		3	0	0	3
LINEAR CONTROL SYSTEMS (V2312204L1)					

Course objectives:

- To introduce the concepts of open loop and closed loop systems, mathematical models ofmechanical and electrical systems, and concepts of feedback
- To study the characteristics of the given system in terms of the transfer function and introducing various approaches to reduce the overall system for necessary analysis
- To develop the acquaintance in analyzing the system response in time-domain and frequency domain in terms of various performance indices
- To analyze the system in terms of absolute stability and relative stability by different approaches
- To design different control systems for different applications as per given specifications
- To introduce the concepts of state variable analysis, design and also the concepts of controllability andobservability.

Course Outcomes:

CO 1: Classify control systems and represent in various models
CO 2: Apply standard test signals to a system to determine their characteristics.
CO 3: Examine the system behavior using various stability analysis techniques
CO 4: Analyze the stability of control systems through time domain and frequency domain approach.
CO 5: Determine the conventional approach, state space approach of control systems

UNIT I:
INTRODUCTION

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

UNIT II:
TRANSFER FUNCTION REPRESENTATION

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. **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.

UNIT III:
STABILITY ANALYSIS IN S-DOMAIN:

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability100

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.

UNIT IV:
FREQUENCY RESPONSE ANALYSIS:

Introduction, Correlation between time and frequency response, Polar Plots, Bode Plots, Nyquist Stability Criterion

UNIT V:
CLASSICAL CONTROL DESIGN TECHNIQUES:

Compensation techniques – Lag, Lead, Lead-Lag Controllers design infrequency Domain,PID Controllers. 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 it's Properties – Concepts of Controllability and Observability.

TEXT BOOKS:

1. Automatic Control Systems 8th edition– by B.C.Kuo – Johnwiley and son's, 2003.
2. Control Systems Engineering –by I. J.Nagrathand M.Gopal, New Age International (P)Limited, Publishers, 2nd edition, 2007
3. Modern Control Engineering–by Katsuhiko Ogata–Pearson Publications, 5th edition, 2015.

REFERENCE BOOKS:

1. Control Systems by A.Nagoorkani, RBA publications, 3 edition, 2017.
2. Control Systems by A.Anandkumar, PHI, 2 Edition, 2014.

II Year - II Semester		L	T	P	C
		3	0	0	3
ELECTROMAGNETIC WAVES AND TRANSMISSION LINES (V231220431)					

Course Objectives:

The main objectives of this course are to:

- Understand the fundamentals of electric fields, coulomb's law and gauss law
- Familiar with of Biot - Savart Law, Ampere's Circuital Law and Maxwell equations
- Aware of electromagnetic wave propagation in dielectric and conducting media
- Study the equivalent circuit of transmission lines and parameters of the transmissionlines
- Learn the working of smith chart and its usage in the calculation of transmission lineparameters

Course Outcomes:

After learning the course, the student will be able to:

CO 1: Determine electric field intensity using coulomb's law and Gauss law.

CO 2: Determine magnetic field intensity using Biot-Savarts Law and Ampere's CircuitalLaw.

CO 3 : Analyze the electromagnetic wave propagation in dielectric and conducting media.

CO 4: Examine the primary and secondary constants of different types of transmission lines.

CO 5: Derive the expressions for input impedance, reflection coefficient, and VSWR of transmission lines and calculate these parameters using smith chart.

UNIT I:

Electrostatics: Review of Co-ordinate Systems, Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss Law and Applications, Electric Potential, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Illustrative Problems. Convection and Conduction Currents, Dielectric Constant, Poisson's and Laplace's Equations Capacitance – Parallel Plate, Coaxial Capacitors, Illustrative Problems.

UNIT II:

Magnetostatics: Biot - Savart 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, Inductances and Magnetic Energy,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, Illustrative Problems.

UNIT III:

EM Wave Characteristics : Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H, Sinusoidal Variations, Wave Propagation in Lossy dielectrics, lossless dielectrics, free space, wave propagation in good conductors, skin depth, Polarization & Types, Illustrative Problems.

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, Illustrative Problems.

UNIT IV:

Transmission Lines - I : Types, Parameters, T & π Equivalent Circuits, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line, Lossless lines, distortion less lines, Illustrative Problems.

UNIT V:

Transmission Lines – II: Input Impedance Relations, Reflection Coefficient, VSWR, Average Power, Shorted Lines, Open Circuited Lines, and Matched Lines, Low loss radio frequency and UHF Transmission lines, UHF Lines as Circuit Elements, Smith Chart – Construction and Applications, Quarter wave transformer, Single Stub Matching, Illustrative Problems.

TEXT BOOKS:

1. Elements of Electromagnetic – Matthew N. O. Sadiku, Oxford University Press, 7th edition, 2018.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2008.

REFERENCE BOOKS:

1. Engineering Electromagnetics – William H. Hayt, John A. Buck, Jaleel M. Akhtar,TMH, 9th edition, 2020.
2. Electromagnetic Field Theory and Transmission Lines –G. S. N. Raju, PearsonEducation 2006
3. Electromagnetic Field Theory and Transmission Lines: G Sasi Bhushana Rao,Wiley India2013.
4. Networks, Lines and Fields John D. Ryder, Second Edition, Pearson Education, 2015.

II Year - II Semester		L	T	P	C
		3	0	0	3
ELECTRONIC CIRCUIT ANALYSIS (V231220432)					

Course Objectives:

The main objectives of this course are:

- To learn hybrid- π parameters a thigh frequency and compare with low frequency parameters.
- Learn and understand the purpose of cascading of single stage amplifiers and derivethe overall voltage gain.
- Analyze the effect of negative feedback on amplifier characteristics and derive thecharacteristics.
- Learn and understand the basic principle of oscillator circuits and perform the analysisof different oscillator circuits.
- Compare and analyze different Power amplifiers like Class A, Class B, Class C, ClassAB and other types of amplifiers. Analyze different types of tuned amplifier circuits.

Course Outcomes:

At the end of this course the student can able to

CO 1: Design and analysis of small signal high frequency transistor amplifier using BJT and FET.

CO 2:Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.

CO 3:Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.

CO 4: Know the classification of the power and tuned amplifiers and their analysis with performance comparison

UNIT-I:

Small Signal High Frequency Transistor Amplifier models:

BJT: Transistor at high frequencies, Hybrid- π common emitter transistor model, Hybrid π conductance, Hybrid π capacitances, validity of hybrid π model, determination of high-frequency parameters in terms of low-frequency parameters , CE short circuit current gain, current gain with resistive load, cut-off frequencies, frequency response and gain bandwidth product.

FET: Analysis of common Source and common drain Amplifier circuits at high frequencies.

UNIT-II:

Multistage Amplifiers: Classification of amplifiers, methods of coupling**, c**ascaded transistor amplifier and its analysis, analysis of two stage RC coupled amplifier, high input resistance transistor amplifier circuits and their analysis-Darlington pair amplifier, Cascode amplifier, Boot-strap emitter follower, Differential amplifier using BJT.

UNIT-III:

Feedback Amplifiers: Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers, Generalized analysis of feedback amplifiers, Performance comparison of feedback amplifiers, Method of analysis of feedback amplifiers.

Unit-IV:

Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phaseshiftandWienbridgeoscillatorswithBJTandFETandtheiranalysis,Generalized analysis of LC Oscillators, Hartley and Colpitt's oscillators using BJT, Frequency and amplitude stability of oscillators.

UNIT-V:

Power Amplifiers: Classification of amplifiers(A to H), Class A power Amplifiers, Class B Push-pull amplifiers, Complementary symmetry push pull amplifier, Class AB power amplifier, Class-C power amplifier, Thermal stability and Heat sinks.

Tuned Amplifiers: Introduction, Q-Factor, small signal tuned amplifier, capacitance single tuned amplifier, double tuned amplifiers, , staggered tuned amplifiers

Text Books:

1. Integrated Electronics- J.Millman and C.C.Halkias, Tata McGraw-Hill, 1972.
2. Electronic Devices and CircuitsTheory –Robert L.Boylestad and Louis Nashelsky, Pearson/PrenticeHall, TenthEdition, 2009.
3. Electronic Devices and Integrated Circuits – B.P. Singh, Rekha, Pearson publications, 2006

References:

1. Electronic Circuit Analysis and Design –Donald A. Neaman, Mc Graw Hill, 2010.
2. Micro electronic Circuits - Sedra A.S. and K.C. Smith, Oxford University Press, Sixth Edition, 2011.
3. Electronic Circuit Analysis-B.V.Rao, K.R. Rajeswari, P.C.R. Pantulu, K.B.R. Murthy, Pearson Publications.

II Year - II Semester		L	T	P	C
		3	0	0	3
ANALOG COMMUNICATIONS (V231220433)					

COURSE OBJECTIVES:

- To understand the various amplitude modulation and demodulation techniques & systems.
- To understand the complex low pass representations, SSB and VSB modulations.
- To understand the angle modulation and demodulation techniques.
- To understand the functions of AM and FM transmitters and receivers.
- To understand the effect of noise on the performance of AM and FM receivers and the principles of PAM, PWM, and PPM, TDM, and FDM techniques

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1:Describe the Modulation and Demodulation techniques of standard AM.

CO 2: Compare different types of Amplitude Modulation and Demodulation techniques.

CO 3: Analyse the concepts of generation and detection of Angle Modulated signals.

CO 4 :Outline the Radio Receivers & Radio Transmitters with different sections.

CO 5:Illustrate the noise performance in Analog Modulation techniques and also the concepts of PulseAnalog Modulation and Demodulation techniques.

Unit – I:

Amplitude Modulation: Introduction to Fourier transform, Introduction to communication system, Need for modulation, Frequency Division Multiplexing, Amplitude Modulation, Time domain and Frequency domain descriptions, Single tone modulation, Power relations in AM waves, Generation of AM waves: Square law Modulator, Switching modulator, AM Transmitter, Effect of feedback on performance of AM Transmitter.

Unit – II:

DSB & SSB Modulation: Double sideband suppressed carrier modulator: Time domain and frequency domain description, Generation of DSBSC Waves: Balanced Modulator, Ring Modulator, Detection of DSBSC Waves: Coherent detection, Quadrature Null Effect, COSTAS Loop, Squaring Loop.

Single sideband suppressed carrier modulation: Time domain and Frequency domain description, Generation of SSBSC Waves: Frequency discrimination method, Phase discrimination method, Demodulation of SSB Waves: Coherent Detection.

Vestigial sideband modulation: Time domain description, Frequency domain description, Generation of VSB Modulated wave, Envelope detection of a VSB Wave pulse Carrier, Comparison of different AM Techniques, Applications of different AM Systems, Related problems.

Unit – III

Angle Modulation: Introduction, Basic concept of phase modulation, 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 Method, Indirect Method, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM, Related problems.

FM Transmitter: Variable reactance type and Phase modulated FM Transmitter, Frequency stability in FM Transmitter.

Unit – IV

Radio Receivers: Receiver Types: Tuned radio frequency receiver, Super heterodyne receiver, RF section and Characteristics, Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Amplitude limiting, Comparison of FM & AM Receivers, Communication Receivers, Extension of super heterodyne principle and additional circuits.

Unit – V

Noise & Information Theory: Review of noise and noise sources, Noise figure, Noise in Analog communication Systems, Noise in DSB & SSB Systems, Noise in AM System and Noise in Angle Modulation Systems, Threshold effect in Angle Modulation System, Pre-emphasis & De-emphasis. Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel.

Pulse Analog Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity), PWM: Generation & Detection of PWM, PPM: Generation and Detection of PPM, Time Division Multiplexing, TDM Vs FDM.

Text Books:

1. Communication Systems, Simon Haykin, Michael Moher, Wiley, 5th Edition, 2009.
2. Principles of Communication Systems, H Taub, D L Schilling, Gautam Sahe, TMH, 4th Edition, 2017.
3. Modern Digital and Analog Communication Systems, B.P.Lathi, Zhi Ding, Hari Mohan Gupta, Oxford University Press, 4th Edition, 2017.
4.

Reference Books:

1. Electronics & Communication Systems, George Kennedy, Bernard Davis, S R M Prasanna,TMH, 6th Edition, 2017.
2. Communication Systems, R P Singh, S D Sapre, TMH, 3nd Edition, 2017.
3. Communication Systems (Analog and Digital), Dr. Sanjay Sharma, Katson Books, 7th Reprint Edition, 2018

Web Links:

1. http://nptel.ac.in/courses/117102059/ Prof. Surendra Prasad.
2. https://ict.iitk.ac.in/wp-content/uploads/EE320A-Principles-Of-Communication-CommunicationSystems-4ed-Haykin.pdf.
3. https://www.scribd.com/document/266137872/sanjay-sharma-pdf.
4. http://bayanbox.ir/view/9144090835198890 86/Book-Modern-Digital-And-AnalogCommunication-Systems-4th-edition-by-Lathi.pdf.
5. https://soaneemrana.org/onewebmedia/ELECTRONICS%20COMMUNICATION%20SYSTEM%20BY%20GEORGE%20KENNEDY.pdf

II Year - II Semester		L	T	P	C
		0	0	3	1.5
SIGNALS AND SYSTEMS LAB (V231220461)					

Course Objectives :

The primary objective of this course is to provide a thorough understanding and analysis of signals and systems using MATLAB.

Course Outcomes :

Upon successful completion of this course the students will be able to:

1. Generate and characterize various continuous and discrete time signals.

2. Design and analyze linear time-invariant (LTI) systems and compute its response.

3. Analyze the spectral characteristics of signals using Fourier analysis.

4. Analyze the systems using Laplace transform and Z-transform.

I.Generation of Basic Signals (Analog and Discrete)

1. Unit step
2. Unit impulse
3. Unit Ramp
4. Sinusoidal
5. Signum

II. Operations on signals

1. Addition & Subtraction
2. Multiplication & Division
3. Maximum & minimum

III. Energy and power of signals ,even and odd signals

IV. Transformation of the independent variable

1. Shifting (Delay & Advance)
2. Reversing
3. Scaling

V. Convolution & De convolution
VI. Correlation
VII Fourier Series Representation
VII. Fourier Transform and Analysis of Fourier Spectrum
VIIIL Laplace Transforms
VIII. Z-Transforms

II Year - II Semester		L	T	P	C
		0	0	3	1.5

ELECTRONIC CIRCUIT ANALYSIS LAB (V231220462)

Note: The students are required to design the circuit and perform the simulationusing Multisim / Equivalent Industrial Standard Licensed simulation software tool**.** Further they are required to verify the result using necessary hardware equipment.

Course Outcomes:

CO1: Inspect network theorems.

CO2 :Plot the frequency response of series RLC circuits and their resonance conditions.

CO3 :Determine two port network parameters and self, mutual inductance of coupled circuits.

CO4: Analyze three phase power drawn by balanced circuits.

CO5: Simulate and analyze electrical circuits using Pspice tools

List of Experiments:

(Minimum of Ten Experiments has to be performed)

1. Determination of Ft of a given transistor.
2. Voltage-Series Feedback Amplifier
3. Current-Shunt Feedback Amplifier
4. RC Phase Shift/Wien Bridge Oscillator
5. Hartley/Colpitt's Oscillator
6. Two Stage RC Coupled Amplifier
7. Darlington Pair Amplifier
8. Boots trapped Emitter Follower
9. Class A Series-fed Power Amplifier
10. Transformer-coupled Class A Power Amplifier
11. Class B Push-Pull Power Amplifier
12. Complementary Symmetry Class B Push-Pull Power Amplifier
13. Single Tuned Voltage Amplifier
14. Double Tuned Voltage Amplifier

Equipment required:

Software:

i. Multisim/Equivalent Industrial Standard Licensed simulation software tool.

ii. Computer Systems with required specifications

Hardware Required:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Millimeters
5. Decade Résistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

II Year - II Semester		L	T	P	C
		0	1	2	2

SOFT SKILLS LAB (V231220471)

Course Objectives:

- To prepare to face global competition for employment and excellence in profession.
- To help the students understand and build interpersonal and interpersonal skills that will enable them to lead meaningful professional life.

CO 1: Assimilate and understood the meaning and importance of soft skills and learn how to develop them.

CO 2: Understand the significance of soft skills in the working environment for professional excellence.

CO 3: Prepare to undergo the placement process with confidence and clarity.

CO 4: Ready to face any situation in life and equip themselves to handle them effectively.

CO 5: Understand and learn the importance of etiquette in both professional and personal life

UNIT – 1: INTRODUCTION

Introduction- Emergence of life skills, Definition & Meaning, Importance& need, reasons for skill gap, Analysis--Soft Skills vs Hard skills, Linkage between industry and soft skills, Challenges, Personality Developments. Soft Skills, Soft Skills vs English - Improving Techniques.

UNIT – II: Intra-Personal:

Definition-Meaning – Importance-SWOT analysis, Johari windows - Goal Setting-quotient skills - Emotional Intelligence- Attitudinal skills - Right thinking- Problem Solving-Time management, stress management.

UNIT – III: Inter-Personal:

Definition – Meaning – Importance-Communications skills- Team Work, managerial skills -Negotiation skills- Leadership skills, corporate etiquettes.

UNIT – IV: Verbal Skills:

Definition and Meaning-Listening skills, need- types, advantages, Importance-Improving Tips for Listening, Speaking, need- types, advantages, Importance-Improving Tips, Reading- Writing Skills, Report, Resume, statement of purpose, need-types, advantages, Importance-Improving Tips .

UNIT – V: Non Verbal Skills& Interview skills

Definition and Meaning – Importance- Facial Expressions- Eye Contact – Proxemics-Haptics -Posture, cross cultural body language, body language in interview room, appearance and dress code – Kinetics- Para Language - tone, pitch, pause, neutralization of accent, use of appropriate language, Interview skills, interview methods and questions.

Text Books:

1) Sherfield, M. Robert at al, Cornerstone Developing Soft Skills, 4/e, PearsonPublication, New Delhi, 2014.
2) Alka Wadkar, Life Skills for Success, 1/e, Sage Publications India Private Limited, 2016.

Reference Books:

1. Sambaiah.M. Technical English, Wiley publishers India. New Delhi. 2014.
2. Gangadhar Joshi, From Campus to Corporate, SAGE TEXT.
3. Alex.K, Soft Skills, 3rd ed. S. Chand Publication, New Delhi, 2014.
4. Meenakshi Raman and Sangita Sharma, Technical Communication: Principle andPractice, Oxford University Press, 2009.
5. Shalini Varma, Body Language for Your Success Mantra, 4/e, S. Chand Publication, New Delhi, 2014.
6. Stephen Covey, Seven Habits of Highly Effective People, JMD Book, 2013.

Online Learning Resources:

- https://onlinecourses.nptel.ac.in/noc20_hs60/preview
- http://www.youtube.com/@softskillsdevelopment6210
- https://youtube.com/playlist?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q&si=Fs05Xh8ZrOPsR8F4
- https://www.coursera.org/learn/people-soft-skills-assessment?language=English
- https://www.edx.org/learn/soft-skills

II Year - II Semester		L	T	P	C
		0	1	2	2

DESIGN THINKING & INNOVATION LAB (V23122CCL2)

Course Objectives: The objectives of the course are to

- Bring awareness on innovative design and new product development.
- Explain the basics of design thinking.
- Familiarize the role of reverse engineering in product development.
- Train how to identify the needs of society and convert into demand.
- Introduce product planning and product development process.

UNIT – I Introduction to Design Thinking

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

UNIT - II Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

UNIT - III Innovation

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity.

Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

UNIT - IV Product Design

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies.

Activity: Importance of modeling, how to set specifications, Explaining their own product design.

UNIT – V Design Thinking in Business Processes

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs. Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes.

Activity: How to market our own product, about maintenance, Reliability and plan for startup.

Textbooks:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

Online Learning Resources:

- https://nptel.ac.in/courses/110/106/110106124/
- https://nptel.ac.in/courses/109/104/109104109/
- https://swayam.gov.in/nd1_noc19_mg60/preview
- https://onlinecourses.nptel.ac.in/noc22_de16/preview

Course Outcomes:

COs	Statements	Blooms Level
CO1	Define the concepts related to design thinking.	L1
CO2	Explain the fundamentals of Design Thinking and innovation.	L2
CO3	Apply the design thinking techniques for solving problems in various sectors.	L3
CO4	Analyse to work in a multidisciplinary environment.	L4
CO5	Evaluate the value of creativity.	L5


SREE VAHINI INSTITUTE OF SCIENCE & TECHNOLOGY
TIRUVURU, A.P.
TECHNOLOGY BRIGADE OF THE NATION