JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
COLLEGE OF ENGINEERING (AUTONOMOUS)
KALIKIRI-517234, ANNAMAYYA (Dt)., A.P., INDIA.

B.TECH.- ELECTRONICS AND COMMUINACTION ENGINEERING

II YEAR COURSE STRUCTURE & SYLLABI

B.Tech.– II Year I Semester

S.No.	Course code	Title	L	T	P	Credits
1	23ABS12	Probability and Complex Variables	3	0	0	3
2	23AHS04	Universal Human Values– Understanding Harmony and Ethical Human Conduct	2	1	0	3
3	23AEC02	Signals, Systems and Stochastic Processes	3	0	0	3
4	23AEC03T	Electronic Devices and Circuits	3	0	0	3
5	23AEC04T	Digital Circuits Design	3	0	0	3
6	23AEC03P	Electronic Devices and Circuits Lab	0	0	3	1.5
7	23AEC04P	Digital Design & Signal Simulation Lab	0	0	3	1.5
8	23ACS07	Python Programming	0	1	2	2
9	23AHS03	Environmental Science	2	0	0	-
Total			16	02	08	20

B.Tech. II Year II Semester

S.No.	Course code	Title	L	T	P	Credits
1	23AHS05a 23AHS05b 23AHS05c	Managerial Economics and Financial Analysis Organizational Behavior Business Environment	2	0	0	2
2	23AEC06	Linear Control Systems	3	0	0	3
3	23AEC08	EM Waves and Transmission Lines	3	0	0	3
4	23AEC07T	Electronic Circuits Analysis	3	0	0	3
5	23AEC09T	Analog and Digital Communications	3	0	0	3
6	23AEC07P	Electronic Circuits Analysis Lab	0	0	3	1.5
7	23AEC09P	Analog and Digital Communications Lab	0	0	3	1.5
8	23AHS06	Soft Skills	0	1	2	2
9	23AHSS3	Design Thinking and Innovation	1	0	2	2
Total			15	1	10	21
Mandatory Community Service Project Internship of 08 weeks duration during summer vacation						

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Course Code	PROBABILITY AND COMPLEX VARIABLES	L	T	P	C
23ABS12		3	0	0	3
Semester	**II B. Tech I Semester (ECE)**				

Course Objectives:

To expose to the field of probability and complex variables, and their applications in electronics and communication engineering.

Course Outcomes (CO): Student will be able to

CO1: Understand the concepts of Probability, Random Variables and their characteristics. (L2, L3).
CO2: Learn how to deal with multiple random variables, conditional probability, jointdistribution and statistical independence. (L3, L3).
CO3: Formulate and solve engineering problems involving random variables. (L3, L5).
CO4: Analyse the behaviour of a complex function and understand Cauchy-Riemann equations in testing the analytic functions. (L2, L3).
CO5: Understand Cauchy integral theorem and use the Cauchy integral formula in evaluating the complex integrals. Expand the complex functions in series and able to find residues and evaluate complex integrals using the residue theorem. (L3, L5).

Pre-requisite:	Basic knowledge on complex variables, probability, random variables (discrete and continuous), and probability distributions.

Unit - I	**PROBABILITY & RANDOM VARIABLE**

Probability 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, Bayes' Theorem, Independent Events.
Random variables: Definition of a random variable - conditions for a function to be a random variable- discrete and continuous random variables - Mixed Random Variable. Distribution and Density functions and their properties: Gaussian random variable - Other distributions and density functions (Binomial, Poisson, Uniform, Exponential and Rayleigh). (Refer Text Book-1)

Unit - II	**OPERATIONS ON RANDOM VARIABLE**

One Random Variable - Expectation: Expected value of a Random variable - Expected value of a function of a Random variable.
Moments: Moments about the origin, Central moments, Variance and Skew, Chebyshev's inequality.
Functions that Give Moments: characteristic function - Moment generating functions.
Multiple Random Variables: Vector Random Variables, Joint Distribution and its properties: Joint distribution function - properties of joint distribution - Marginal Distribution Functions.
Joint density and its properties: joint density function - properties of Joint density - Marginal density functions. Conditional distribution and density - point conditioning. Statistical Independence. (Refer Text Book-1)

Unit - III	**OPERATIONS ON MULTIPLE RANDOM VARIABLES**

Expected Value of a Function of Random Variables: Joint Moments about the Origin - Joint Central Moments. Joint Characteristic Functions.
Jointly Gaussian Random Variables: Two Random Variables case, - N Random Variable case - Properties of Gaussian random variables. (Refer Text Book-1)

Unit - IV	**COMPLEX VARIABLE – DIFFERENTIATION**

Introduction to functions of complex variable-concept of Limit & continuity- Differentiation, Cauchy-Riemann equations, analytic functions harmonic functions, finding harmonic conjugate-construction of analytic function by Milne Thomson method.

Unit - V	COMPLEX VARIABLE – INTEGRATION

Line integral- Cauchy's integral theorem (Simple Case), Cauchy Integral formula, Power series expansions: Taylor's series, zeros of analytic functions, singularities, Laurent's series, Residues, Cauchy Residue theorem (without proof).

Learning Resources:

Textbooks:

1. Peyton Z. Peebles, Probability, Random Variables & Random Signal Principles, 4/e, TMH, 2002.

2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

Reference Books:

1. A. Papoulis and S. Unnikrishna Pillai, Probability, Random Variables andStochastic Processes, 4/e, PHI, 2002.

2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2018.

3. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill, 2006, New Delhi.

Web Resources:

1. https://onlinecourses.nptel.ac.in/noc20_ma50/preview
2. https://onlinecourses.nptel.ac.in/noc21_ma66/preview#:~:text=This%20course%20provides%
3. 20random%20variable, and%20simple%20Markovian%20queueing%20models.

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Course Code		L	T	P	C
23AHS04	UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT (Common to all Branches)	2	1	0	3
Semester	**II B. Tech I Sem (CE, EEE, ME, ECE, CSE & FT)**				

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 holistic perspective 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 (CO): Student will be able to

CO1: Define the terms like Natural Acceptance, Happiness and Prosperity. L1, L2
CO2: Identify one's self, and one's surroundings (family, society nature). L1, L2
CO3: Apply what they have learnt to their own self in different day-to-day settings in real life. L3
CO4: Relate human values with human relationship and human society. L4
CO5: Justify the need for universal human values and harmonious existence. L5
CO6: 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 practice session)

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 the body.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
Lecture 9: The body as an Instrument of the self
Lecture 10: Understanding Harmony in the self
Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
Lecture 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 practice session)

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust
Lecture 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 Relationship
Lecture 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 practice session)

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual fulfilment among the Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature
Lecture 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** (6 lectures 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 and Universal 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 towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance

Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the difference of Needs of self and body
PS5 Exploring Sources of Imagination in the self
PS6 Exploring Harmony of self with the body

Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 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 Professional Ethics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Learning Resources:

Textbooks 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 and Professional Ethics*, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

1.

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 Beautifu*l - Cecile Andrews
7. *Economy of Permanence* - J C Kumarappa
8. *Bharat Mein Angreji Raj* – PanditSunderlal
9. *Rediscovering India* - by Dharampal
10. *Hind Swaraj or Indian Home Rule* - by Mohandas K. Gandhi
11. *India Wins Freedom* - Maulana Abdul Kalam Azad
12. *Vivekananda* - Romain Rolland (English)
13. *Gandhi* - Romain Rolland (English)

Web Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023-25%20Ethics%20v1.pdf
8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385
9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them. Tutorial hours are to be used for practice sessions. While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also

provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.
It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.
Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

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Course Code		L	T	P	C
23AEC02	SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES	3	0	0	3
Semester	**II Year B.Tech. – I Semester(ECE BRANCH)**				

Course Objectives:

- Understanding the basics of signals and systems required for ECE courses.
- To teach concepts of signals and systems and its analysis using different transform techniques.
- To provide basic understanding of random processes which is essential for the random signals and systems encountered in communications and signal Processing areas.

Course Outcomes (CO): Student will be able to

- Understand the mathematical description and representation of continuous-time and discrete-time signals and systems, Also, understand the concepts of various transform techniques and Random Processes (L2)
- Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems. (L3)
- Formulate and solve engineering problems involving random processes. (L3)
- Analyze the frequency spectra of various continuous-time signals using different transform methods. (L4)
- Classify the systems based on their properties and determine the response of them. (L4)

Unit - I

Signals & Systems: Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals, Analogy between vectors and Signals-Orthogonality, mean square error,
Fourier series: Trigonometric & Exponential forms of Fourier series, Properties, Concept of discrete spectrum, Illustrative Problems.

Unit - II

Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform. Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Reconstruction of signal from its samples, Effect of under sampling – Aliasing. Illustrative Problems.
Laplace Transform: Definition, ROC, Properties, Inverse Laplace transforms, the s-plane and BIBO stability, Transfer functions, System Response to standard signals, Solution of differential equations with initial conditions, Illustrative Problems.

Unit - III

Signal Transmission through Linear Systems: Linear system, impulse response, Response of a linear system for different input signals, 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, Energy and Power spectral densities, Illustrative Problems.

Unit - IV

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict Sense Stationarity, Time Averages and Ergodicity, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal, Mean and Mean-squared Value

of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

Unit - V

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The 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 Density Spectrums of Input and Output.

Learning Resources:

Textbooks:

1. Peyton Z. Peebles, "Probability, Random Variables & Random Signal Principles", 4th Edition, TMH, 2002.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd Edition, PHI, 2009.

Reference Books:

1. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.
2. Athanasios Papoulis and S. Unnikrishna Pillai, "Probability, Random Variables and Stochastic Processes", 4th Edition, PHI, 2002
3. Simon Haykin and Van Veen, "Signals & Systems", 2nd Edition, Wiley, 2005.
4. Matthew Sadiku and Warsame H. Ali, "Signals and Systems A primer with MATLAB", CRC Press, 2016.
5. Hwei Hsu, "Schaum's Outline of Signals and Systems", 4thEdition, TMH, 2019.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		**L**	**T**	**P**	**C**
23AEC03T	ELECTRONIC DEVICES & CIRCUITS	**3**	**0**	**0**	**3**
Semester	**II Year B.Tech. – I Semester(ECE BRANCH)**				

Course Objectives:

- Students will be able understand the basic principles of all semiconductor devices.
- Able to analyse diode circuits, various biasing and small signal equivalent circuits of amplifiers, compare the performance of BJTs and MOSFETs
- Able to design rectifier circuits and various amplifier circuits using BJTs and MOSFETs.

Course Outcomes (CO): After the completion of the course students will be able to

- Understand principle of operation, characteristics and applications of semiconductor diodes, special diodes, BJTs, JFET and MOSFETs. (L2)
- Applying the basic principles solving the problems related to Semiconductor diodes, BJTs, and MOSFETs. (L3)
- Analyze diode circuits for different applications such as rectifiers, clippers and clampers also analyze biasing circuits of BJTs, and MOSFETs. (L4)
- Design of diode circuits and amplifiers using BJTs, and MOSFETs. (L4)
- Compare the performance of various semiconductor devices. (L4)

Unit - I

PN junction diode: Review, diode current equation, Diode resistance, Transition and Diffusion Capacitance, effect of temperature on PN junction diode, Quantitative analysis of Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Illustrative problems.
Special Diodes: Construction, operation and VI characteristics of Tunnel Diode, Varactor Diode, LED, LCD, Photo Diode, SCR and UJT.

Unit - II

Review of Bipolar Junction Transistors, Characteristics, Transistor as an Amplifier and as a Switch, BJT Configurations, Limits of Operation, BJT Specifications.
Biasing and Stabilization: Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Collector to Base Bias, Self-Bias, Bias Stability, Thermal Runaway, Thermal Stability, Illustrative problems.

Unit - III

BJT Small Signal Operation and Models- the trans conductance, input resistance at the base, input resistance at the emitter, Voltage gain, separating the Signal and the DC Quantities, The Hybrid π Model, the T Model. Single Stage BJT Amplifiers - Common-Emitter (CE) amplifier without and with emitter resistance, Common-Base (CB) amplifier, Common Collector (CC) amplifier or Emitter Follower, Problem solving.

Unit - IV

Junction Field Effect Transistor (FET): Construction, Principle of Operation, V–I Characteristics, Comparison of BJT and FET, FET as Voltage Variable Resistor. FET biasing.
MOS Field Effect Transistors: Introduction, Device Structure and Physical Operation, CMOS, V - I Characteristics, MOSFET Circuits at DC, MOSFET as an Amplifier and as a Switch. Biasing in MOS Amplifier circuits - biasing by fixing VGS with and without source resistance, biasing using drain to gate feedback resistor, biasing using constant current source, body effect, Problem solving.

Unit - V

MOSFET Small Signal Operation Models– the dc bias, separating the DC analysis and the signal analysis, Small signal equivalent circuit models, the trans conductance, the T equivalent circuit model, Single stage MOS Amplifiers – common source (CS) amplifier without and with source resistance, common gate (CG) amplifier, source follower, Problem Solving.

Learning Resources:

1. Adel S. Sedra and Kenneth C. Smith, "Microelectronic Circuits – Theory and Applications", 6th Edition, Oxford Press, 2013.
2. J. Milliman and C Halkias, "Integrated electronics", 2nd Edition, Tata McGraw Hill, 1991.

Reference Books:

1. Donald A Neamen, "Electronic Circuits – analysis and design", 3rd Edition, McGraw Hill (India), 2019.
2. Behzad Razavi, "Microelectronics", Second edition, Wiley, 2013.
3. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits," 9th Edition, Pearson, 2006.
4. Jimmie J Cathey, "Electronic Devices and Circuits," Schaum's outlines series, 3rd edition, McGraw-Hill (India), 2010.

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Course Code		L	T	P	C
23AEC04T	DIGITAL CIRCUITS DESIGN	3	0	0	3
Semester	**II Year B.Tech. – I Semester(ECE BRANCH)**				

Course Objectives:

- Understand the properties of Boolean algebra, logic operations, and minimization of Boolean functions.
- Analyze combinational and analyze sequential logic circuits.
- Understand the concepts of FSM and compare various Programmable logic devices.
- Model combinational and sequential circuits using HDLs.

Course Outcomes (CO): After the completion of the course students will be able to

- Understand the properties of Boolean algebra, logic operations, concepts of FSM (L2)
- Apply techniques for minimization of Boolean functions (L3)
- Analyze combinational and Sequential logic circuits. (L4)
- Compare various Programmable logic devices. (L4)
- Design and Model combinational and sequential circuits using HDLs. (L5, L6)

Unit - I **Boolean algebra, logic operations, and minimization of Boolean functions**

Review of Number Systems and Codes, Representation of unsigned and signed integers, Floating Point representation of real numbers, Laws of Boolean Algebra, Theorems of Boolean Algebra, Realization of functions using logic gates, Canonical forms of Boolean Functions, Minimization of Functions using Karnaugh Maps.

Unit - II **Combinational Logic Circuits**

Combinational circuits, Design with basic logic gates, design procedure, adders, subtractors, 4-bit binary adder/ subtractor circuit, BCD adder, carry look- a-head adder, binary multiplier, magnitude comparator, data selectors, priority encoders, decoders, multiplexers, demultiplexers.

Unit - III **Hardware Description Language**

Introduction to Verilog - structural specification of logic circuits, behavioral specification of logic circuits, hierarchical Verilog Code, Verilog for combinational circuits - conditional operator, if-else statement, case statement, for loop using sequential circuits with CAD tools.

Unit - IV **Sequential Logic Circuits**

Basic architectural distinction between combinational and sequential circuits, Design procedure, latches, flip-flops, truth tables and excitation tables, timing and triggering consideration, conversion of flip- flops, design of counters, ripple counters, synchronous counters, ring counter, Johnson counter, registers, shift registers, universal shift register. Verilog constructs for sequential circuits, flip-flop with clear capability, using Verilog constructs for registers and counters.

Unit - V **Finite State Machines and Programmable Logic Devices**

Types of FSM, capabilities and limitations of FSM, state assignment, realization of FSM using flip-flops, Mealy to Moore conversion and vice-versa, reduction of state tables using partition technique, Design of sequence detector. Types of PLD's: PROM, PAL, PLA, basic structure of CPLD and FPGA, advantages of FPGAs.

Learning Resources:

1. M. Morris Mano, “Digital Design”, 3rd Edition, PHI. (Unit I to IV)
2. Stephen Brown and ZvonkoVranesic, “Fundamentals of Digital Logic with Verilog Design”, 3rd Edition, McGraw-Hill (Unit V)

Reference Books:

1.Charles H. Roth, Jr, “Fundamentals of Logic Design”, 4th Edition, Jaico Publishers.
2. ZviKohavi and NirajK.Jha, “Switching and Finite Automata Theory, 3rd Edition, Cambridge University Press, 2010.
3. Samir Palnitkar, “Verilog HDL: A Guide to Digital Design and Synthesis”, 2ndEdition, Prentice Hall PTR.
4. D.P. Leach, A.P. Malvino, “Digital Principles and Applications”, TMH, 7th Edition.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	ELECTRONIC DEVICES & CIRCUITS LAB	L	T	P	C
23AEC03P		0	0	3	1.5
Semester	**II Year B.Tech. – I Semester(ECE BRANCH)**				

Course Objectives:

- Verify the theoretical concepts practically from all the experiments.
- Analyse the characteristics of Diodes, BJT, MOSFET, UJT.
- Design the amplifier circuits from the given specifications.
- Model the electronic circuits using tools such as PSPICE/Multisim.

Course Outcomes:

- Understand the characteristics and applications of basic electronic devices. (L2)
- Plot the characteristics of electronic devices. (L3)
- Analyze various biasing circuits and electronic circuits as amplifiers (L4).
- Design MOSFET / BJT based amplifiers for the given specifications. (L5)
- Simulate all circuits in PSPICE /Multisim. (L5).

List of Experiments: (Implement / Execute any 10 experiments).

1.Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
2. Study and draw the Volt Ampere characteristics of UJT and determine η, IP, Iv, VP, &Vv from the experiment.
3. Verification of the input and output characteristics of BJT in Common Emitter configuration experimentally and find required parameters from the graphs.
4. Study and draw the input and output characteristics of BJT in Common Base configuration experimentally and determine required parameters from the graphs.
5. Verification of the input and output characteristics of BJT in Common Collector configuration experimentally and find required parameters from the graphs Study and draw the V- I characteristics of JFET experimentally.
6. Study and draw the output and transfer characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find Threshold voltage (VT), gm, & K from the graphs.
7. Study and draw the output and transfer characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find IDSS, gm, & VP from the graphs.
8. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
9. Design and analysis of self-bias circuit using MOSFET.
10. Design a suitable circuit for switch using MOSFET/BJT.
11. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
12. Design a small signal amplifier using BJT (common emitter) for the given specifications. Draw the frequency response and find the bandwidth.

Tools / Equipment Required: Software Tool like Multisim/ Pspice or Equivalent, DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC04P	DIGITAL DESIGN & SIGNAL SIMULATION LAB	0	0	3	1.5
Semester	II Year B.Tech. – I Semester(ECE BRANCH)				

Course Objectives:

- Verify the truth tables of various logic circuits.
- Design sequential/combinational circuit using Hardware Description Language and verify their functionality.
- Simulate various Signals and Systems through MATLAB
- Analyze the output of a system when it is excited by different types of deterministic and random signals..

Course Outcomes:

- Verify the truth tables of various logic circuits. (L2)
- Understand how to simulate different types of signals and system response. (L2)
- Design sequential and combinational logic circuits and verify their functionality. (L3, L4)
- Analyze the response of different systems when they are excited by different signals and plot power spectral density of signals. (L4)
- Generate different random signals for the given specifications. (L5)

List of Experiments: PART A

1. Design a simple combinational circuit with four variables and obtain minimal SOP expression and verify the truth table using Digital Trainer Kit.
2. Verification of functional table of 3 to 8-line Decoder /De-multiplexer
3. 4 variable logic function verification using 8 to1 multiplexer.
4. Design full adder circuit and verify its functional table.
5. Design a four-bit ring counter using D Flip–Flops/JK Flip Flop and verify output.
6. Design a four-bit Johnson's counter using D Flip-Flops/JK Flip Flops and verify output
7. Verify the operation of 4-bit Universal Shift Register for different Modes of operation.
8. 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.
9. Design MOD–8 synchronous counter using T Flip-Flop and verify the result and sketch the output waveforms.
10. (a) Draw the circuit diagram of a single bit comparator and test the output (b) Construct 7 Segment Display Circuit Using Decoder and7 Segment LED and test it.

Note: Design and verify combinational and sequential circuits using Hardware Description Language

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

List of Experiments: PART B

1.Write a program to generate various Signals and Sequences: Periodic and Aperiodic, Unit Impulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp, Sinc function.

2. Perform operations on Signals and Sequences: Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.

3. Write a program to find the trigonometric & exponential Fourier series coefficients of a rectangular periodic signal. Reconstruct the signal by combining the Fourier series coefficients with appropriate weightings- Plot the discrete spectrum of the signal.

4. Write a program to find Fourier transform of a given signal. Plot its amplitude and phase spectrum.

5. Write a program to convolve two discrete time sequences. Plot all the sequences.

6. Write a program to find autocorrelation and cross correlation of given sequences.

7. Write a program to verify Linearity and Time Invariance properties of a given Continuous System.

8. Write a program to generate discrete time sequence by sampling a continuous time signal. Show that with sampling rates less than Nyquist rate, aliasing occurs while reconstructing the signal.

9. Write a program to find magnitude and phase response of first order low pass and high pass filter. Plot the responses in logarithmic scale.

10. Write a program to generate Complex Gaussian noise and find its mean, variance, Probability Density Function (PDF) and Power Spectral Density (PSD).

11. Generate a Random data (with bipolar) for a given data rate (say 10kbps). Plot the same for a time period of 0.2 sec.

12. To plot pole-zero diagram in S-plane of given signal/sequence and verify its stability.

Note: Any 10 experiments. All the experiments are to be simulated using MATLAB or equivalent software.

References: Stephen J. Chapman, "MATLAB Programming for Engineers", Cengage, November 2012.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	PYTHON PROGRAMMING (Common to All Branches)	L	T	P	C
23ACS07		0	0	2	1
Semester	**II B. Tech I Semester**				

Course Objectives:

- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries.
- Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these.

CO1: Showcase adept command of Python syntax, deftly utilizing variables, data types, control structures, functions, modules, and exception handling to engineer robust and efficient code solutions. (L4).
CO2: Apply Python programming concepts to solve a variety of computational problems (L3).
CO3: Understand the principles of object-oriented programming (OOP) in Python, including classes, objects, inheritance, polymorphism, and encapsulation, and apply them to design and implement Python programs (L3).
CO4: Proficient in using commonly used Python libraries and frameworks such as JSON, XML, NumPy, pandas (L2)
CO5: Exhibit competence in implementing and manipulating fundamental data structures such as lists, tuples, sets, dictionaries (L3).

Course Outcomes (CO): Student will be able to

Unit - I

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.

Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.

Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:

1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
   i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators viii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

Unit - II

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments. Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings. Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

Sample Experiments:

7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list:

i. additionii. insertioniii. slicing

12. Write a program to perform any 5 built-in functions by taking any list.

Unit - III

Dictionaries: Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozenset.

Sample Experiments:

13. Write a program to create tuples (name, age, address, college) for at least two members and concatenate the tuples and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary.

Unit - IV

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os. path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

Sample Experiments:

18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices.
23. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

Unit - V

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumssssPy with Python, Pandas.

Sample Experiments:

24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
    a) Apply head () function to the pandas data frame
    b) Perform various data selection operations on Data Frame
30. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib

Learning Resources:

Textbooks:

Reference Books:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

Web Resources:

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	ENVIRONMENTAL SCIENCE (Common to All Branches)	L	T	P	C
23AHS03		2	0	0	0
Semester	**II B. Tech I Semester**				

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.
- To understand the problems related to social issues and Wild life protection acts.
- To know the importance of value education and welfare programs.

CO1: Grasp multidisciplinary nature of environmental studies and various renewable and non-renewable resources.
CO2: Understand flow and bio-geo chemical cycles and ecological pyramids.
CO3: Understand various causes of pollution and solid waste management and related preventive measures.
CO4: About the rainwater harvesting, watershed management, ozone layer depletion and waste land reclamation.
CO5: Cause of population explosion, value education and welfare programs.

Course Outcomes (CO): Student will be able to

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 and exploitation, 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:
Learning outcomes:
At the end of this unit, the students will be able to
• To know the importance of public awareness
• Explain how natural resources should be used.

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 0 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-situ and Ex-situ conservation of biodiversity.
Learning outcomes:
At the end of this unit, the students will be able to
• To get a clear picture of echo systems and their characteristics.
• To get awareness about land degradation, soil erosion and desertification.

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.
Learning outcomes:
At the end of this unit, the students will be able
• To understand the causes, effects and preventive measures of various pollution.
• To understand the various sources of solid waste and preventive measures.
• To know about the different types of disasters and their managerial measures.

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.
Learning outcomes:
At the end of this unit, the students will be able to
• To know about the social issues related to environment and their protection acts.
• To know about the various sources of conservation of natural resources.

Unit - V	

Human Population and The Environment: Population growth, variation among nations. Population explosion — Family Welfare Programs. — 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...
Learning outcomes:
At the end of this unit, the students will be able
• To understand population explosion and family welfare programs.
To identify the natural assets and related case studies.

Learning Resources:

Textbooks:

1. Text book of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press, 2nd Edition, 2013.
2. Palaniswamy, "Environmental Studies", Pearson education, 2nd Edition. 2014.
3. 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", Cengage Publications, Revised Edition, 2023.
2. J.P.Sharma, Comprehensive Environmental studies, Laxmi publications, 3rd Edition, 2009.
3. J. G. Henry and G. W. Heinke, "Environmental Sciences and Engineering", Prentice hall of India Private limited, 2nd Edition 2007.
4. G.R. Chatwa1, "A Text Book of Environmental Studies" Himalaya Publishing House, 1st edition, 2004.

5. G. M. Masters and W. P. Ela, “Introduction to Environmental Engineering and Science, Prentice hall of India Private limited, 3rd Edition, 2008.

Web Resources:

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	Managerial Economics and Financial Analysis	L	T	P	C
23AHS05a		2	0	0	2
Semester	**II B. Tech II Semester Common to CE, EEE, CSE, ECE & FT**				

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 learn how to plan long-term investment decisions.
- To provide fundamental skills on accounting and to explain the process of preparing financial statements.

Course Outcomes (CO): Student will be able to

- Define the concepts related to Managerial Economics, financial accounting and management(L2)
- Understand the fundamentals of Economics viz., Demand, Production, cost, revenue and markets (L2)
- Apply the Concept of Production cost and revenues for effective Business decision (L3)
- Analyze how to invest their capital and maximize returns (L4)
- Evaluate the capital budgeting techniques. (L5)
- Develop the accounting statements and evaluate the financial performance of business entity (L5)

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. ProductionFunction Least- cost combination– Short run and long run Production Function- Iso-quant's and Iso-costs, Cost & Break-Even Analysis - Cost concepts and Cost behavior- 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, TrialBalance- 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.

Learning Resources:

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, New Age 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.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	ORGANISATIONAL BEHAVIOUR	L	T	P	C
23AHS05b		2	0	0	2
Semester	II B. Tech II Semester Common to CE, EEE, CSE, ECE & FT				

Course Objectives:

- To enable student's comprehension of organizational behavior
- To offer knowledge to students on self-motivation, leadership and management
- To facilitate them to become powerful leaders
- To Impart knowledge about group dynamics
- To make them understand the importance of change and development

Course Outcomes (CO): Student will be able to

- Define the Organizational Behaviour, its nature and scope. (L2)
- Understand the nature and concept of Organizational behaviour (L2)
- Apply theories of motivation to analyse the performance problems (L3)
- Analyse the different theories of leadership (L4)
- Evaluate group dynamics (L5)
- Develop as powerful leader (L5)

UNIT - I **INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR**

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - Understanding Individual Behavior –Attitude -Perception - Learning – Personality.

UNIT - II **MOTIVATION AND LEADING**

Theories of Motivation- Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory - Vroom's theory of expectancy – Mc Cleland's theory of needs–Mc Gregor's theory X and theory Y– Adam's equity theory.

UNIT - III **ORGANIZATIONAL CULTURE**

Introduction – Meaning, scope, definition, Nature - Organizational Climate - Leadership - Traits Theory– Managerial Grid - Transactional Vs Transformational Leadership - Qualities of good Leader - Conflict Management -Evaluating Leader.

UNIT - IV **GROUP DYNAMICS**

Introduction – Meaning, scope, definition, Nature- Types of groups - Determinants of group Behaviour - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - Team building - Conflict in the organization– Conflict resolution

UNIT - V **ORGANIZATIONAL CHANGE AND DEVELOPMENT**

Introduction –Nature, Meaning, scope, definition and functions- Organizational Culture - Changing the Culture – Change Management – Work Stress Management - Organizational management – Managerial implications of organization's change and development

Learning Resources:

Textbooks:

3. Luthans, Fred, OrganisationalBehaviour, McGraw-Hill, 12 Th edition
4. P Subba Ran, OrganisationalBehaviour, Himalya Publishing House.

Reference Books:

1. McShane, Organizational Behaviour, TMH

2. Nelson, OrganisationalBehaviour, Thomson.
3. Robbins, P. Stephen, Timothy A. Judge, OrganisationalBehaviour, Pearson.
4. Aswathappa, OrganisationalBehaviour, Himalaya.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	BUSINESS ENVIRONMENT	L	T	P	C
23AHS05c		2	0	0	2
Semester	II B. Tech II Semester Common to CE, EEE, CSE, ECE & FT				

Course Objectives:

- To make the student to understand about the business environment
- To enable them in knowing the importance of fiscal and monitory policy
- To facilitate them in understanding the export policy of the country
- To Impart knowledge about the functioning and role of WTO
- To Encourage the student in knowing the structure of stock markets

Course Outcomes (CO): Student will be able to

- Define Business Environment and its Importance. (L2)
- Understand various types of business environment. (L2)
- Apply the knowledge of Money markets in future investment (L3)
- Analyze India's Trade Policy (L4)
- Evaluate fiscal and monitory policy (L5)
- Develop a personal synthesis and approach for identifying business opportunities(L5)

UNIT - I **OVERVIEW OF BUSINESS ENVIRONMENT**

Introduction – meaning Nature, Scope, significance, functions and advantages. Types- Internal &External, Micro and Macro. Competitive structure of industries -Environmental analysis- advantages & limitations of environmental analysis.

UNIT - II **FISCAL & MONETARY POLICY**

Introduction – Nature, meaning, significance, functions and advantages. Public Revenues - Public Expenditure - Evaluation of recent fiscal policy of GOI. Highlights of Budget- Monetary Policy - Demand and Supply of Money –RBI -Objectives of monetary and creditpolicy - Recent trends- Role of Finance Commission.

UNIT - III **INDIA'S TRADE POLICY**

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank - Balance of Payments– Structure & Major components - Causes for Disequilibrium in Balance of Payments - Correction measures.

UNIT - IV **WORLD TRADE ORGANIZATION**

Introduction – Nature, Significance, Functions And Advantages. Organization And Structure -Role And Functions Of WTO In Promoting World Trade - GATT -Agreements In The UruguayRound –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping And Anti-Dumping Measures.

Unit - V **MONEY MARKETS AND CAPITAL MARKETS**

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – SEBI – Stock Exchanges- Investor protection and role of SEBI, Introduction to international finance.

Learning Resources:

Textbooks:

1. Francis Cherunilam, International Business: Text and Cases, Prentice Hall of India.
2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises 13thRevised Edition.HPH

Reference Books:

1. K. V. Sivayya, V. B. M Das, Indian Industrial Economy, Sultan Chand Publishers, New Delhi, India.
2. Sundaram, Black, International Business Environment Text and Cases, Prentice Hall ofIndia, New Delhi, India.
3. Chari. S. N, International Business, Wiley India.
4. E. Bhattacharya, International Business, Excel Publications, New Delhi.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC06	LINEAR CONTROL SYSTEMS	3	0	0	3
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- Introduce the basic principles and applications of control systems.
- Learn the time response and steady state response of the systems.
- Know the time domain analysis and solutions to time invariant systems.
- Understand different aspects of stability analysis of systems in frequency domain.
- Understand the concept of state space, controllability and observability.

Course Outcomes (CO): After completing the course, the student should be able to:

- Summarize the basic principles and applications of control systems. (L2)
- Understand the time response and steady state response of the systems. (L2)
- Understand the concept of state space, controllability and observability. (L2)
- Apply time domain analysis to find solutions to time invariant systems. (L3)
- Analyze different aspects of stability analysis of systems in frequency domain. (L4)

Unit - I

Control Systems Concepts: Open loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback characteristics, Effects of positive and negative feedback, Mathematical models – Differential equations of translational and rotational mechanical systems and electrical systems, Analogous Systems, Block diagram reduction methods – Signal flow graphs - Reduction using Mason's gain formula. Controller components, DC Servomotor and AC Servomotor their transfer functions, Synchros.

Unit - II

Time Response Analysis: Step Response - Impulse Response - 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, Study of effects and Design of P, PI, PD and PID Controllers on second order system.

Unit - III

Stability Analysis in Time Domain: The concept of stability – Routh's stability criterion – Stability and conditional stability - limitations of Routh's stability. 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, Frequency domain Specifications-Bode Diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram - Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Phase margin and Gain margin-Stability Analysis. Compensation techniques – Study of Effects and Design of Lag, Lead, Lag-Lead Compensator design in frequency Domain on a second order system.

Unit - V

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model - differential equations & Transfer function models - Block diagrams. Diagonalization, Transfer function from state model, solving the Time invariant state Equations- State Transition Matrix and its Properties. System response through State Space models. The concepts of controllability and observability,

Learning Resources:

Textbooks:

1. Modern Control Engineering by Katsuhiko Ogata, Prentice Hall of India Pvt. Ltd., 5 thedition, 2010.
2. Control Systems Engineering by I. J. Nagrath and M. Gopal, New Age International (P) Limited Publishers, 5th edition, 2007.

References:

1. Control Systems Principles & Design by M.Gopal, 4th Edition, McGraw Hill Education,2012.
2. Automatic Control Systems by B. C. Kuo and Farid Golnaraghi, John wiley and sons, 8th edition,2003.
3. Feedback and Control Systems, Joseph J Distefano III, Allen R Stubberud & Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education,2013.
4. Control System Design by Graham C. Goodwin, Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. Feedback Control of Dynamic Systems by Gene F. Franklin, J.D. Powell and Abbas Emami- Naeini, 6th Edition, Pearson,2010.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC08	EM WAVES AND TRANSMISSION LINES	3	0	0	3
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- To understand and analyze different laws and theorems of electrostatic fields.
- To study and analyze different laws and theorems of magneto static fields.
- Analysing Maxwell's equations in different forms.
- To learn the concepts of wave theory and its propagation through various mediums.
- To get exposure to the properties of transmission lines.

Course Outcomes (CO): At the end of this course the student will be able to:

- Learn the concepts of wave theory and its propagation through various mediums. (L2)
- Understand the properties of transmission lines and their applications. (L2)
- Apply the laws & theorems of electrostatic fields to solve the related problems (L3)
- Gain proficiency in the analysis and application of magneto static laws and theorems (L4).
- Analyze Maxwell's equations in different forms. (L4)

Unit - I

Review of Co-ordinate Systems, Electrostatics: 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 Magneto static 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 InternalReflection, 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.

Learning Resources:

Textbooks:

1. Elements of Electromagnetics, Matthew N.O. Sadiku, 4th Edition, Oxford University Press, 2008.
2. Electromagnetic Waves and Radiating Systems, E.C. Jordan and K.G. Balmain, 2nd Edition, PHI, 2000.

References:

1. Electromagnetic Field Theory and Transmission Lines, G. S. N. Raju, 2nd Edition, Pearson Education, 2013.
2. Engineering Electromagnetics, William H. Hayt Jr. and John A. Buck, 7th Edition, Tata McGraw Hill, 2006.
3. Electromagnetics, John D. Krauss, 3rd Edition, McGraw Hill, 1988.
4. Networks, Lines, and Fields, John D. Ryder,2nd Edition, PHI publications, 2012.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC07T	ELECTRONIC CIRCUITS ANALYSIS	3	0	0	3
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- Understand the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers
- Categorize different oscillator circuits based on the application
- Design the electronic circuits for the given specifications and for a given application.

Course Outcomes (CO): At the end of this course the student will be able to:

- Understand the characteristics of differential amplifiers, feedback and power amplifiers. (L2)
- Examine the frequency response of multistage and differential amplifier circuits using BJT & MOSFETs at low and high frequencies. (L3)
- Investigate different feedback and power amplifier circuits based on the application. (L4)
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillator circuits. (L4)
- Evaluate the performance of different tuned amplifiers (L5)
- Design analog circuits for the given specifications and application. (L6)

Unit - I

Multistage & Differential Amplifiers: Introduction, Classification of Amplifiers, Distortion in amplifiers, Coupling Schemes, RC Coupled Amplifier using BJT, Cascaded RC Coupled BJT Amplifiers, Cascode amplifier, Darlington pair, the MOS Differential Pair, Small-Signal Operation of the MOS Differential Pair, The BJT Differential Pair, and other Nonideal Characteristics of the Differential Amplifier.

Unit - II

Frequency Response: Low-Frequency Response of the CS and CE Amplifiers, Internal Capacitive Effects and the High-Frequency Model of the MOSFET and the BJT, High Frequency Response of the CE, Emitter follower, CS, CD, fβ,fT and gain bandwidth product.

Unit - III

Feedback Amplifiers: Introduction, The General Feedback Structure, Some Properties of Negative Feedback, The Four Basic Feedback Topologies, Series—Shunt, Series—Series, Shunt—Shunt, Shunt—Series.
Oscillators: General Considerations, Phase Shift Oscillator, Wien-Bridge Oscillator, LC Oscillators, Relaxation Oscillator, Crystal Oscillators, Illustrative Problems.

Unit - IV

Power Amplifiers: Introduction, Class A amplifiers (Series fed, Transformer coupled, Push pull), Second Harmonic distortion, Class B amplifiers (Push pull, Complementary symmetry), Crossover distortion and Class AB operation, Class C amplifiers, Power BJTs, MOS power transistors.

Unit - V

Tuned Amplifiers: Introduction, single Tuned Amplifiers – Q-factor, frequency response, Double Tuned Amplifiers – Q-factor, frequency response, Concept of stagger tuning and synchronous tuning.
Multivibrators: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

Learning Resources:

Textbooks:

1. Adel. S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits," 6th Edition, Oxford University Press, 2011.
2. J. Millman, H. Taub and Mothiki S. PrakashRao - Pulse, Digital and Switching Waveforms –2nd Ed., TMH, 2008.
3. Millman, C Chalkias, "Integrated Electronics", 4thEdition, McGraw Hill Education (India) Private Ltd., 2015.

References:

1. Behzad Razavi, "Fundamentals of Micro Electronics", Wiley, 2010.
2. Donald A Neamen, "Electronic Circuits – Analysis and Design," 3rdEdition, McGraw Hill (India), 2019.
3. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits Theory", 9th Edition, Pearson/Prentice Hall, 2006.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code	ANALOG AND DIGITAL COMMUNICATIONS	L	T	P	C
23AEC09T		3	0	0	3
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- Introduce various modulation and demodulation techniques of analog and digital communication systems.
- Analyze different parameters of analog and digital communication techniques.
- Understand function of various stages of AM, FM transmitters and Know characteristics of AM &FM receivers.
- Analyze the performance of various digital modulation techniques in the presence of AWGN.

Course Outcomes (CO): At the end of this course the student will be able to:

- Recognize the basic terminology used in analog and digital communication technique for transmission of information/data. (L1)
- Explain the basic operation of different analog and digital communication systems at baseband and passband level. (L2)
- Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge. (L3)
- Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise. (L4)
- Evaluate the performance of all analog and digital modulation techniques to know the merits and demerits of each one of them in terms of bandwidth and power efficiency. (L5)

Unit - I

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

Unit - II

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

Unit - III

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

Unit - IV

Introduction to Noise: Types of Noise, Receiver Model, Noise in AM, DSB, SSB, and FM Receivers. Pulse Modulation: Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM. **Pulse Code Modulation**: PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, Delta Modulation, DPCM, Noise in PCM and DM.

Unit - V

Digital Modulation Techniques: Coherent Digital Modulation Schemes – ASK, BPSK, BFSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency. **Baseband Transmission and Optimal Reception of Digital Signal:** A Baseband Signal Receiver, Probability of Error, Optimum Receiver, Coherent Reception, ISI, Eye Diagrams.

Learning Resources:

Textbooks:

1. Simon Haykin, "Communication Systems", JohnWiley& Sons, 4th Edition, 2004.
2. Wayne Tomasi - Electronics Communication Systems-Fundamentals through Advanced, 5 thEd., PHI, 2009
3. B. P. Lathi, Zhi Ding " Modern Digital and Analog Communication Systems", Oxford press, 2011.

References:

1.Sam Shanmugam, "Digital and Analog Communication Systems",JohnWiley& Sons, 1999.
2. Bernard Sklar, F. J. harris"Digial Communications: Fundamentals andApplications", Pearson Publications, 2020.
3. Taub and Schilling, " Principles of Communication Systems", Tata McGraw Hill, 2007.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC07P	ELECTRONIC CIRCUITS ANALYSIS LAB	0	0	3	1.5
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- Plot the characteristics of Differential amplifiers, feedback and power amplifiers.
- Analyze the response of tuned amplifiers and multivibrators.
- Categorize different oscillator circuits based on the application.
- Design the electronic circuits for the given specifications and for a given application.

Course Outcomes:

- Know about the usage of equipment/components/software tools used to conduct experiments in analog circuits. (L2)
- Conduct the experiment based on the knowledge acquired in the theory about various analog circuits using BJT/MOSFETs to find the important parameters of the circuit experimentally. (L3)
- Analyze the given analog circuit to find required important metrics of it theoretically. (L4)
- Compare the experimental results with that of theoretical ones and infer the conclusions. (L4)
- Design the circuit for the given specifications. (L6)

List of Experiments:

1. Design and Analysis of Darlington pair.
2. Frequency response of CE – CC multistage Amplifier
3. Design and Analysis of Cascode Amplifier.
4. Frequency Response of Differential Amplifier
5. Design and Analysis of any two topologies of feedback amplifies and find the frequency response of it.
6. Design and Analysis of Class A power amplifier.
7. Design and Analysis of Class AB amplifier.
8. Design and Analysis of RC phase shift oscillator.
9. Design and Analysis of LC Oscillator
10. Frequency Response of Single Tuned amplifier
11. Design a Bistable Multivibrator and analyze the effect of commutating capacitors anddraw the wave forms at base and collector of transistors.
12. Design an Astable Multivibrator and draw the wave forms at base and collector oftransistors.
13. Design a Monostable Multivibrator and draw the input and output waveforms.
14. Draw the response of Schmitt trigger for gain of greater than and less than one.

Note: At least 12 experiments shall be performed.

Faculty members who are handling the laboratory shall see that students are given design specifications for a given circuit appropriately and monitor the design and analysis aspects of the circuit.

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AEC09P	ANALOG AND DIGITAL COMMUNICATIONS LAB	0	0	3	1.5
Semester	**II Year B.Tech. – II Semester(ECE BRANCH)**				

Course Objectives:

- Understand the basics of analog and digital modulation techniques.
- Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
- Design and implement different modulation and demodulation techniques and their applications.
- • Develop cognitive and behavioral skills for performance analysis of various modulation techniques.

Course Outcomes:

- Know about the usage of equipment/components/software tools used to conduct experiments in analog and digital modulation techniques. (L2)
- Conduct the experiment based on the knowledge acquired in the theory about modulation and demodulation schemes to find the important metrics of the communication system experimentally. (L3)
- Analyze the performance of a given modulation scheme to find the important metrics of the system theoretically. (L4)
- Compare the experimental results with that of theoretical ones and infer the conclusions. (L4)

List of Experiments:

Design the circuits and verify the following experiments taking minimum of six from each section shown below.

Section-A

1. AM Modulation and Demodulation
2. DSB-SC Modulation and Demodulation
3. Frequency Division Multiplexing
4. FM Modulation and Demodulation
5. Radio receiver measurements
6. PAM Modulation and Demodulation
7. PWM Modulation and Demodulation
8. PPM Modulation and Demodulation

Section-B

1. Sampling Theorem.
2. Time Division Multiplexing
3. Delta Modulation and Demodulation
4. PCM Modulation and Demodulation
5. BPSK Modulation and Demodulation
6. BFSK Modulation and Demodulation
7. QPSK Modulation and Demodulation
8. DPSK Modulation and Demodulation

Note: Faculty members (who are handling the laboratory) are requested to instruct the students not to use readymade kits for conducting the experiments. They are advised to make

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B.TECH.- ELECTRONICS AND COMMUNICATION ENGINEERING

Course Code		L	T	P	C
23AHS06	**Soft Skills** (Common to all Branches)	0	1	2	2
Semester	**II B. Tech II Sem (CE, ME & ECE)**				

Course Objectives:

- To encourage all round development of the students by focusing on soft skills
- To make the students aware of critical thinking and problem-solving skills
- To enhance healthy relationship and understanding within and outside an organization
- To function effectively with heterogeneous teams

Course Outcomes (CO): Student will be able to

CO1: List out various elements of soft skills L1, L2
CO2: Describe methods for building professional image L1, L2
CO3: Apply critical thinking skills in problem solving L3
CO4: Analyse the needs of an individual and team for well-being L4
CO5: Assess the situation and take necessary decisions. L5
CO6: Create a productive work place atmosphere using social and work-life skills ensuring personal and emotional well-being. L6

UNIT I — **Soft Skills & Communication Skills**

Soft Skills - Introduction, Need - Mastering Techniques of Soft Skills – Communication Skills - Significance, process, types - Barriers of communication - Improving techniques.

Activities:

Intrapersonal Skills- Narration about self- strengths and weaknesses- clarity of thought – self- expression – articulating with felicity.

(The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources)

Interpersonal Skills- Group Discussion – Debate – Team Tasks - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.

Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- convincing- negotiating- agreeing and disagreeing with professional grace.

Non-verbal communication – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation, Types of Non-verbal Communication - Controlling nervousness

UNIT II — **Critical Thinking**

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking - Positive thinking – Reflection.

Activities:

Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others -Lectures of motivational speakers, Case Study, Story Analysis

UNIT III — **Problem Solving & Decision Making**

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Team building - Effective decision making in teams – Methods & Styles

Activities:

Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion.

UNIT IV	Emotional Intelligence & Stress Management

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips

Activities:

Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, sympathy, and confidence, compassion in the form of written or oral presentations.

Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates, Six Thinking Hats technique

UNIT V	Corporate Etiquette

Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Awareness - Etiquette in interaction- Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette -Corporate grooming tips -Overcoming challenges - Negotiations and Meeting management

Activities

Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games, Chinese Whisper Games

NOTE-:

1. The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes, epics, scriptures, autobiographies and literary sources which bear true relevance to the prescribed skill.
2. Case studies may be given wherever feasible for example for Decision Making- The decision of King Lear.

Learning Resources:

Textbooks:

1.Mitra Barun K, *Personality Development and Soft Skills*, Oxford University Press, Pap/Cdr edition 2012

2.Sharma, Sangeeta & Mishra, Binod, *Communication Skills for Engineers & Scientists*, 2nd Edn. PHI 2023

Reference Books:

1. Sharma, Prashant, *Soft Skills: Personality Development for Life Success*, BPB Publications 2018.

2. Alex K, *Soft Skills* S.Chand & Co, 2012 (Revised edition)

3. Gajendra Singh Chauhan & Sangeetha Sharma, *Soft Skills: An Integrated Approach to Maximise Personality* Published by Wiley, 2013

4. Pillai, Sabina & Fernandez Agna, *Soft Skills and Employability Skills*, Cambridge University Press, 2018

Web Resources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc
7. https://www.businesstrainingworks.com/training-resource/five-free-business-etiquette-training-games/
8. https://onlinecourses.nptel.ac.in/noc24_hs15/preview

9. https://onlinecourses.nptel.ac.in/noc21_hs76/preview

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B.TECH.- ELECTRONICS AND COMMUINACTION ENGINEERING

Course Code	DESIGN THINKING & INNOVATION (Common to All Branches)	L	T	P	C
23AHSS3		2	0	0	2
Semester	**II B. Tech II Semester**				

Course Objectives:

- The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

CO1: Define the concepts related to design thinking. L1, l2
CO2: Explain the fundamentals of Design Thinking and innovation. L1, L2
CO3: Apply the design thinking techniques for solving problems in various sectors. L3
CO4: Analyze to work in a multidisciplinary environment. L4
CO5: Evaluate the value of creativity. L5
CO6: Formulate specific problem statements of real time issues. L3, L6

Course Outcomes (CO): Student will be able to

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, brain storming, 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 modelling, 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.

Learning Resources:

Textbooks:

1. Tim Brown, Change by design, Harper Bollins (2009)
2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shrutin N Shetty, Design the Future, Norton Press
3. William Lidwell,Universal Principles of Design- Kritinaholden, Jill Butter.

4. Chesbrough.H, The Era of Open Innovation – 2013

Web Resources:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview