SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B.Tech R23 - COURSE STRUCTURE AND SYLLABI

Semester III (Second Year)

S. No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23BSC235	Probability and Complex Variables	2	1	-	3	30	70	100
2	23HSM234	Universal Human Values – Understanding Harmony and Ethical Human Conduct	2	1	-	3	30	70	100
3	23ECE231	Digital Circuits Design	2	1	-	3	30	70	100
4	23ECE232	Electronic Devices and Circuits	2	1	-	3	30	70	100
5	23ECE233	Signals, Systems and Stochastic Processes	2	1	-	3	30	70	100
6	23ECE234	Digital Circuits Design Lab	-	-	3	1.5	30	70	100
7	23ECE235	Electronic Devices and Circuits Lab	-	-	3	1.5	30	70	100
8	23CSE235	Python Programming (SOC)	-	1	2	2	30	70	100
9	23MAC231	Environmental Science	2	-	-	-	P	-	-
Contact Hours per week			1	06	08	-	-	-	-
Total Hours per week						-	-	-	-
Total credits						20	-	-	-
Total Marks							270	630	900

Semester IV (Second Year)

S. No	Course Code	Course Title	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
			L	T	P	C	I	E	Total
1	23HSM231/ 23HSM232/ 23HSM233/	Business Environment / Managerial Economics and Financial Analysis / Organizational Behavior	2	-	-	2	30	70	100
2	23ESC241	Electromagnetic Waves and Transmission Lines	2	1	-	3	30	70	100
3	23ECE241	Analog and Digital Communications	2	1	-	3	30	70	100
4	23ECE242	Electronic Circuits Analysis	2	1	-	3	30	70	100
5	23ECE243	Linear Control Systems	2	1	-	3	30	70	100
6	23ECE244	Analog and Digital Communications Lab	-	-	3	1.5	30	70	100
7	23ECE245	Electronic Circuits Analysis Lab	-	-	3	1.5	30	70	100
8	23HSM241	Soft Skills	-	1	2	2	30	70	100
9	23ESC241	Design Thinking and Innovation	1	-	2	2	30	70	100
Contact Hours per week			11	5	10	-	-	-	-
Total Hours per week						-	-	-	-
Total credits						21	-	-	-
Total Marks							270	630	900
Mandatory Community Service Project Internship of 06-08 weeks duration during summer Vacation									

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II B.TECH. - III SEMESTER

23ECE231	**DIGITAL CIRCUITS DESIGN**	**L T P C**
		2 1 - 3

PRE-REQUISITES: Basic Electronics Engineering

COURSE OBJECTIVES:

1. To study and understand the properties of Boolean algebra, logic operations, and minimization of Boolean functions.
2. To analyze combinational logic circuits.
3. To analyze the sequential logic circuits.
4. To study and understand the concepts of FSM and compare various Programmable logic devices.
5. To study and understand the hardware description language such as Verilog HDL.

UNIT I: BOOLEAN ALGEBRA (9)

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 (9)

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: SEQUENTIAL LOGIC CIRCUITS (9)

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.

UNIT IV: FINITE STATE MACHINES AND PROGRAMMABLE LOGIC DEVICES (9)

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, Design of sequential circuits using ROMs, PLAs, CPLDs and FPGAs.

UNIT V: HARDWARE DESCRIPTION LANGUAGE (9)

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 storage elements with CAD tools-using Verilog constructs for storage elements, flip-flop with clear capability, using Verilog constructs for registers and counters.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate knowledge on the properties of Boolean algebra, logic operations, and minimization of Boolean functions.	**PO1, PO2**
CO2	Design the combinational logic circuits and realize PLD for given sequence	**PO1, PO2, P03**
CO3	Understand the hardware description language such as Verilog HD: and VHDL	**PO1, PO2, P03**
CO4	Understand and design the sequential logic circuits.	**PO1, PO2, P03, PO4**
CO5	Understand and analyze the concepts of FSM and compare various Programmable logic devices.	**PO1, PO2, P03, PO4**

TEXTBOOKS:

1. M. Morris Mano, "Digital Design", 3rd Edition, PHI, 2001.
2. Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with Verilog Design", 3rd Edition, McGraw-Hill, 2014.

REFERENCE BOOKS:

1. Charles H. Roth, Jr, "Fundamentals of Logic Design", 4th Edition, Jaico Publishers, 2004.
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", 2nd Edition, Prentice Hall PTR, 2003.
4. D.P. Leach, A.P. Malvino, "Digital Principles and Applications", TMH, 7th Edition, 2010.

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3			-	-	-	-	-	-	-	-
CO.2	3	3	2	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	3	2	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.5**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
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II B.TECH. - III SEMESTER

23ECE232	**ELECTRONIC DEVICES & CIRCUITS**	**L T P C**
		2 1 - 3

PRE-REQUISITES: Basic Electronics Engineering

COURSE EDUCATIONAL OBJECTIVES:

1. To study and understand the basic principles of all semiconductor devices and Rectifiers.
2. To study and analyze the BJT operation and various biasing circuits.
3. To study and analyses the working principles and character tics of MOSFET and compare the performance of BJTs and MOSFETs
4. To understand and analyze the small signal equivalent circuits of BJT amplifier.
5. To study and analyze the MOSET small signal equivalent circuits.

UNIT I: SEMICONDUCTOR AND SPECIAL DIODES (9)

PN junction diode: Band structure of PN Junction, Quantitative Theory of PN Diode, types of PN junction diode, VI Characteristics, PN diode current equation, Diode resistance, Transition and Diffusion Capacitance, effect of temperature on PN junction diode, Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics, Clipping and Clamping circuits, Voltage doubler ,Illustrative problems.

Special Diodes: Zener and Avalanche Breakdowns, VI Characteristics of Zener diode, Zener diode as voltage regulator, Construction, operation and VI characteristics of Tunnel Diode, Varactor Diode, LED, LCD, Photo Diode, SCR and UJT.

UNIT II: BJT AND BIASING (9)

Bipolar Junction Transistors: Transistor construction, BJT Operation, Transistor as an Amplifier and as a Switch, Common Emitter, Common Base and Common Collector 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: MOSFET AND BIASING (9)

MOS Field Effect Transistors: Introduction, Device Structure and Physical Operation, 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, CMOS, V - I Characteristics, Problem solving.

UNIT IV: SMALL SIGNAL ANALYSIS OF BJT (9)

BJT Small Signal Operation and Models- the transconductance, 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 V: SMALL SIGNAL ANALYSIS OF MOSFET (9)

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

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate concepts and Analyze the characteristics of the PN junction diode, Special diodes and Rectifiers with and without filters.	**PO1, PO2, PO3**
CO2	Investigate the working of BJT transistor and its configuration. Demonstrate basic concepts of BJT transistor biasing	**PO1, PO2, PO3, PO4**
CO3	Demonstrate basic concepts of MOSFET transistor biasing	**PO1, PO2**
CO4	Investigate the small signal low frequency BJT transistor amplifier using Hybrid-∏	**PO1, PO2, PO3, PO4**
CO5	Investigate the small signal low frequency BJT transistor amplifier.	**PO1, PO2, PO4**

TEXTBOOKS:

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.

REFERENCES:

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.

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	2	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-
CO.3	3	3	-	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	2	-	-	-	-	-	-	-	-
CO.5	3	3	-	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.6**	**2.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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II B.TECH. - III SEMESTER

		L	T	P	C
23ECE233	**SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES**	**2**	**1**	**-**	**3**

PRE-REQUISITES: Basic Electronics Engineering, Mathematics

COURSE OBJECTIVES:

1. To study and understanding the basics of signals and systems and Fourier series.
2. To recall the concepts of Fourier transform & Laplace transform and apply & analyze the same for different continuous time signal.
3. To apply and analyze the signal transmission through linear systems.
4. To provide basic understanding of random processes which is essential for the random signals and systems encountered in communications and signal Processing areas.
5. To understand and analysis the random process spectral characteristics

UNIT I: SIGNALS & SYSTEMS: (9)
Basic definitions and classification of Signals and Systems (Continuous time and discrete time), operations on signals, Concepts of Convolution and Correlation of signals.

UNIT II : TRANSFORMS (9)
Fourier Transform: Definition, Computation and properties of Fourier transform for different types of signals and systems, Inverse Fourier transform.
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: LINEAR TIME INVARIANT SYSTEM (9)
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.
Sampling: Sampling theorem – Graphical and analytical proof for Band Limited Signals, Reconstruction of signal from its samples, Effect of under sampling – Aliasing. Illustrative Problems.

UNIT IV: RANDOM PROCESSES–TEMPORAL CHARACTERISTICS: (9)
The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

UNIT V: RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: (9)
The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties.
Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrated the concept of signals and system and analyze. Determine Fourier series coefficient of different type of signals.	**PO1, PO2, P03**
CO2	Determine Fourier Transform and Laplace Transforms for different type of signals.	**PO1, PO2, P03, PO4**
CO3	Analyze the signal transmission through Linear system and to describe the ideal characteristics of LPF, HPR and BPF.	**PO1, PO2, P03, PO4**
CO4	Demonstrate the concepts of Stochastic process and its classification such as wide sense & ergodocity random process. Determine cross correlation and auto correlation	**PO1, PO2**
CO5	Determine PSD. Evaluate relation between auto correlation and cross correlation .Finding the response of mean,mean square and correlation .	**PO1, PO2**

TEXTBOOKS:

1. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", 2nd Edition, PHI, 2009.
2. Probability, Random Variables and Random Signal Principles by Peyton Peebles July 2017

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.

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	3	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	2	-	-	-	-	-	-	-	-
CO.3	3	3	3	2	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.6**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.Tech. -III Semester

23ECE234	DIGITAL CIRCUIT DESIGN LAB	L	T	P	C
		-	-	3	1.5

PRE-REQUISITES: Digital Circuit Design

COURSE EDUCATIONAL OBJECTIVES:

1. Verify the truth tables of various logic circuits.
2. Design combinational circuit using Hardware Description Language and verify their functionality.
3. Design sequential circuit using Hardware Description Language and verify their functionality.
4. Verify all the experiments using hardware components as well as Verilog Programming.

List of Experiments:

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. 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 both Hardware Description Language and hardware components.

References:

1. M. Morris Mano, "Digital Design", 3rd Edition, PHI, 2001.

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COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Verify the truth tables of various logic circuits.	**PO1**
CO2	Analyze and Understand how to simulate different combinational and sequential circuits.	**PO2**
CO3	Design sequential and combinational logic circuits and verify their functionality.	**PO3**
CO4	Use the Modern tool to analyze the response of different systems when they are excited by different inputs.	**PO5**
CO5	Follow the ethical values in designing the circuits.	**PO8**
CO6	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO7	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO8	Continue updating their design skill related to for various circuits based on application during their life time	**PO12**

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	3	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	3	-	-	-
CO7	-	-	-	-	-	-	-	-	-	3	-	-
CO8	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**-**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

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II B.TECH. - III SEMESTER

		L	T	P	C
23ECE235	**ELECTRONIC DEVICES & CIRCUITS LAB**	**-**	**-**	**3**	**1.5**

PRE-REQUISITES: Electronic Devices and Circuits

COURSE OBJECTIVES:

1. To verify the theoretical concepts practically from all the experiments.
2. To study and Analyze the characteristics of Diodes, BJT, MOSFET, UJT.
3. To study and design the amplifier circuits from the given specifications.
4. To learn and design the electronic circuits using tools such as PSPICE/Multisim.

LIST OF EXPERIMENTS: (**Execute any 12 experiments**).

Note: All the experiments shall be implemented using both Hardware and Software.

1. Verification of Volt- Ampere characteristics of a PN junction diode and find static, dynamic and reverse resistances of the diode from the graphs obtained.
2. Design a full wave rectifier for the given specifications with and without filters, and verify the given specifications experimentally. Vary the load and find ripple factor. Draw suitable graphs.
3. Verify various clipping and clamper circuits using PN junction diode and draw the suitable graphs.
4. Design a Zener diode-based ***voltage regulator*** against variations of supply and load. Verify the same from the experiment.
5. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Enhance mode) in Common Source Configuration experimentally. Find ***Threshold voltage (V_T), g_m, & K*** from the graphs.
6. Study and draw the ***output*** and ***transfer*** characteristics of MOSFET (Depletion mode) or JFET in Common Source Configuration experimentally. Find ***I_{DSS}, g_m, & V_P*** from the graphs.
7. Verification of the input and output characteristics of BJT in **Common Emitter** configuration experimentally and find required ***h – parameters*** from the graphs.
8. Study and draw the input and output characteristics of BJT in **Common Base** configuration experimentally and determine required ***h – parameters*** from the graphs.
9. Study and draw the Volt Ampere characteristics of UJT and determine ***η, I_P, I_v, V_P, &Vv*** from the experiment.
10. Design and analysis of voltage- divider bias/self-bias circuit using BJT.
11. Design and analysis of self-bias circuit using MOSFET.
12. Design a suitable circuit for switch using MOSFET/BJT.
13. Design a small signal amplifier using MOSFET (common source) for the given specifications. Draw the frequency response and find the bandwidth.
14. 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 Toollike 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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COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate knowledge on identification & testing of passive components along with active devices.	**PO1**
CO2	Analyze the practical characteristics of diodes and transistor with different configurations	**PO2**
CO3	Design Simple electronic circuits by soldering with specifications	**PO3**
CO4	Analyze the special purpose devices with their characteristics for future applications	**PO4**
CO5	Implement the devices like LED, LDR, Photo diode etc. for society applications	**PO6**
CO6	Follow ethical principles on analysis of different electronic circuits which is used for project works.	**PO8**
CO7	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO9	Continue updating their skill related to electronic devices and their applications during their life time	**PO12**

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**-**	**3**	**-**	**3**	**3**	**3**	**-**	**3**

II B.Tech. - II Semester

23ESC241 EM WAVES AND TRANSMISSION LINES

L	T	P	C
2	1	-	3

PRE-REQUISITES: Engineering Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. To understand and analyze different laws and theorems of electrostatic fields.
2. To study and analyze different laws and theorems of magnetostatic fields.
3. To analyze the Maxwell's equations in different forms.
4. To learn the concepts of wave theory and its propagation through various mediums.
5. To get exposure to the properties of transmission lines.

UNIT –1: ELECTROSTATICS (9)

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 –2: MAGNETOSTATICS (9)

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 –3: EM WAVE CHARACTERISTICS (9)

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 –4: TRANSMISSION LINES - I (9)

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 –5: TRANSMISSION LINES - II (9)

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.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Learn the concepts of wave theory and its propagation through various mediums. (L2)	**PO1, PO2, P03, PO4**
CO2	Understand the properties of transmission lines and their applications. (L2)	**PO1, PO2, P03, PO4**
CO3	Apply the laws & theorems of electrostatic fields to solve the related problems (L3)	**PO1, PO2, P03, PO4**
CO4	Gain proficiency in the analysis and application of magnetostatic laws and theorems (L4).	**PO1, PO2, P03, PO4**
CO5	Analyze Maxwell's equations in different forms. (L4)	**PO1, PO2, P03, PO4**

TEXT BOOKS:

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.

REFERENCE BOOKS:

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.

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112/103/112103109/
2. https://nptel.ac.in/courses/122/104/122104015/
3. https://www.digimat.in/nptel/courses/video/112106180/L01.html
4. https://nptel.ac.in/courses/112/106/112106286/
5. https://nptel.ac.in/courses/112/105/112105164/
6. https://nptel.ac.in/courses/112/103/112103108/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.Tech. - II Semester

		L	T	P	C
23ECE241	**ANALOG AND DIGITAL COMMUNICATIONS**	**2**	**1**	**-**	**3**

PRE-REQUISITES: Engineering Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. Introduce various modulation and demodulation techniques of analog and digital communication systems.
2. Analyze different noise and pulse modulation techniques.
3. Understand function of baseband pulse transmission methods.
4. Analyze the functions of digital passband transmission methods.
5. Analyze the performance of various digital modulation techniques in the presence of AWGN.

UNIT 1: CONTINUOUS WAVE MODULATION (9)

Introduction: The communication Process, Communication Channels, Baseband and Passband Signals, Analog vs Digital Communications, Need for the modulation.

Amplitude Modulation (AM): AM and its modifications – DSB, SSB, VSB. Frequency Translation, Frequency Division Multiplexing (FDM).

Angle Modulation: Frequency Modulation (FM), Phase Modulation, PLL, Nonlinear Effects in FM, Superheterodyne Receivers.

UNIT 2: NOISE AND PULSE MODULATION (9)

Introduction to Noise: Types of Noise, Receiver Model, Noise in AM, DSB, SSB, and FM Receivers, Pre-Emphasis and De-emphasis in FM.

Introduction to Pulse Modulation: The Sampling Process, PAM, TDM, Bandwidth-Noise Trade off, Quantization process, PCM, Noise considerations in PCM systems, Delta Modulation, DPCM, Coding speech at low bit rates.

UNIT 3: BASEBAND PULSE TRANSMISSION (9)

Introduction, Matched Filter, Properties of Matched Filter, Error rate due to noise, Inter Symbol Interference (ISI), Nyquist Criterion for distortion less baseband binary transmission, Correlative level coding, Baseband M-ary PAM transmission, QAM, MAP and ML decoding, Equalization, Eye pattern.

UNIT 4: DIGITAL PASSBAND TRANSMISSION (9)

Introduction, Passband Transmission Model, Gram-Schmidt Orthogonalization Procedure, Geometric Interpretation of Signals, Response of bank of correlators in noise, Correlation receiver, Probability of Error, Detection of Signals with unknown phase.

UNIT 5: DIGITAL MODULATION SCHEMES (9)

Coherent Digital Modulation Schemes – ASK, BPSK, BFSK, QPSK, Non-coherent BFSK, DPSK. M-ary Modulation Techniques, Power Spectra, Bandwidth Efficiency, Timing and Frequency synchronization.

Information theory: Entropy, Mutual Information and Channel capacity theorem.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Recognize the basic terminology used in analog and digital communication technique for transmission of information/data.	**PO1, PO2, P03, PO4**
CO2	Explain the basic operation of different analog and digital communication systems at baseband and passband level.	**PO1, PO2, P03, PO4**
CO3	Compute various parameters of baseband and passband transmission schemes by applying basic engineering knowledge.	**PO1, PO2, P03, PO4**
CO4	Analyze the performance of different modulation & demodulation techniques to solve complex problems in the presence of noise.	**PO1, PO2, P03, PO4**
CO5	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.	**PO1, PO2, P03, PO4**

TEXT BOOKS:

1. Simon Haykin, "Communication Systems", John Wiley & Sons, 4th Edition, 2004.
2. B. P. Lathi, Zhi Ding "Modern Digital and Analog Communication Systems", Oxford press, 2011.

REFERENCE BOOKS:

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

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112/103/112103109/
2. https://nptel.ac.in/courses/122/104/122104015/
3. https://www.digimat.in/nptel/courses/video/112106180/L01.html
4. https://nptel.ac.in/courses/112/106/112106286/
5. https://nptel.ac.in/courses/112/105/112105164/
6. https://nptel.ac.in/courses/112/103/112103108/
7. https://nptel.ac.in/courses/122/104/122104014/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.Tech. - II Semester

		L	T	P	C
23ECE242	**ELECTRONIC CIRCUITS ANALYSIS**	**2**	**1**	**-**	**3**

PRE-REQUISITES: Engineering Mathematics

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the characteristics of multistage and Differential amplifiers.
2. Analyze the frequency response of BJT and FET amplifiers
3. Understand the characteristics of feedback amplifiers.
4. Categorize different oscillator circuits based on the application and analyze the tuned amplifiers.
5. Analyze the power amplifiers for various applications.

UNIT 1: MULTISTAGE AND DIFFERENTIAL AMPLIFIERS (9)

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 –2: FREQUENCY RESPONSE (9)

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 CS, follower, CE, CG and Cascode Amplifiers.

UNIT –3: FEEDBACK AMPLIFIERS (9)

Feedback Amplifiers: Introduction, The General Feedback Structure, Some Properties of Negative Feedback, The Four Basic Feedback Topologies, The Feedback Voltage Amplifier (Series—Shunt), The Feedback Transconductance Amplifier (Series—Series), The Feedback Trans-Resistance Amplifier (Shunt—Shunt), The Feedback Current Amplifier (Shunt—Series).

UNIT –4: OSCILLATORS AND TUNED AMPLIFIERS (9)

Oscillators: General Considerations, Phase Shift Oscillator, Wien-Bridge Oscillator, LC Oscillators, Relaxation Oscillator, Crystal Oscillators, Illustrative Problems.

Tuned Amplifiers: Basic Principle, Use of Transformers, Single Tuned Amplifiers, Amplifiers with multiple Tuned Circuits, Stagger Tuned Amplifiers.

UNIT –5: POWER AMPLIFIERS (9)

Introduction, Classification of Output Stages, Class A Output Stage, Class B Output Stage, Class AB Output Stage, Biasing the Class AB Circuit, CMOS Class AB Output Stages, Power BJTs, Variations on the Class AB Configuration, Class C amplifier, MOS Power Transistors.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Understand the characteristics of multistage and differential amplifiers.	**PO1, PO2, P03, PO4**
CO2	Examine the frequency response of multistage and differential amplifier circuits using BJT & MOSFETs at low and high frequencies.	**PO1, PO2, P03, PO4**
CO3	Investigate different feedback amplifiers based on the application.	**PO1, PO2, P03, PO4**
CO4	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillator circuits. Evaluate the performance of different tuned amplifiers	**PO1, PO2, P03, PO4**
CO5	Understand the characteristics of power amplifiers.	**PO1, PO2, P03, PO4**

TEXT BOOKS:

1. Millman, C Chalkias, "Integrated Electronics", 4thEdition, McGraw Hill Education (India) Private Ltd., 2015.
2. Adel. S. Sedra and Kenneth C. Smith, "Micro Electronic Circuits," 6th Edition, Oxford University Press, 2011.

REFERENCE BOOKS:

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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   https://nptel.ac.in/courses/122/104/122104015/
2. https://www.digimat.in/nptel/courses/video/112106180/L01.html
3. https://nptel.ac.in/courses/112/106/112106286/
4. https://nptel.ac.in/courses/112/105/112105164/
5. https://nptel.ac.in/courses/112/103/112103108/
6. https://nptel.ac.in/courses/122/104/122104014/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.Tech. - IV Semester

23ECE243	LINEAR CONTROL SYSTEMS	L	T	P	C
		2	1	-	3

PRE-REQUISITES: Engineering Mathematics

COURSE EDUCATIONAL OBJECTIVES:

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

UNIT –1: CONTROL SYSTEMS CONCEPTS: (9)

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 –2: TIME RESPONSE ANALYSIS: (9)

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 –3: STABILITY ANALYSIS IN TIME DOMAIN: (9)

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 –4: FREQUENCY RESPONSE ANALYSIS: (9)

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 –5: STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS: (9)

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 it's Properties. System response through State Space models. The concepts of controllability and observability, Duality between controllability and observability.

DIGITAL CONTROL SYSTEMS:

Introduction to Digital control systems, Design of Digital Control Systems, Applications.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Summarize the basic principles and applications of control systems.	PO1, PO2, P03, PO4
CO2	Understand the time response and steady state response of the systems.	PO1, PO2, P03, PO4
CO3	Understand the concept of state space, controllability and observability.	PO1, PO2, P03, PO4
CO4	Apply time domain analysis to find solutions to time invariant systems.	PO1, PO2, P03, PO4
CO5	Analyze different aspects of stability analysis of systems in frequency domain.	PO1, PO2, P03, PO4

TEXT BOOKS:

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

REFERENCE BOOKS:

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.

REFERENCE WEBSITE:

1. https://nptel.ac.in/courses/112/103/112103109/
2. https://nptel.ac.in/courses/122/104/122104015/
3. https://www.digimat.in/nptel/courses/video/112106180/L01.html
4. https://nptel.ac.in/courses/112/106/112106286/
5. https://nptel.ac.in/courses/112/105/112105164/
6. https://nptel.ac.in/courses/112/103/112103108/
7. https://nptel.ac.in/courses/122/104/122104014/

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	2	2	-	-	-	-	-	-	-	-
CO.2	3	2	2	2	-	-	-	-	-	-	-	-
CO.3	3	2	2	2	-	-	-	-	-	-	-	-
CO.4	3	2	2	2	-	-	-	-	-	-	-	-
CO.5	3	2	2	2	-	-	-	-	-	-	-	-
CO*	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.TECH. - II SEMESTER

23ECE244	**ANALOG AND DIGITAL COMMUNICATIONS LAB**	**L T P C** **- - 3 1.5**

PRE-REQUESITES: Analog and Digital Communication

COURSE OBJECTIVES:

1. To understand the basics of analog and digital modulation techniques.
2. To understand the Integrate theory with experiments so that the students appreciate the knowledge gained from the theory course.
3. To design and implement different modulation and demodulation techniques and their applications.
4. To develop cognitive and behavioral skills for performance analysis of various modulation techniques.

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 the students work in the laboratory by constructing the circuits and analyzing them during the lab sessions.

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(Autonomous)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE OUTCOMES:

On successful completion of the course, students will be able to		**Pos**
CO1	Demonstrate knowledge on analog and Digital communication systems	**PO1**
CO2	Analyze the functionality of generation and degeneration of modulation techniques	**PO2**
CO3	Design the circuits which are used to improve the SNR in FM systems	**PO3**
CO4	Conduct investigation and test the functionality on implementation of generation and degeneration circuits.	**PO4**
CO5	Select appropriate trainer Kit and procedure to analyze and implement analog and Digital modulation systems	**PO6**
CO6	Follow ethical principles in analyzing and implementing various base band and band pass modulation techniques	**PO8**
CO7	Do experiments effectively as an individual and as a member in a group.	**PO9**
CO8	Communicate verbally and in written form, the understandings about the experiments.	**PO10**
CO9	Continue updating their skill related to communication for various applications during their life time.	**PO12**

CO-PO MAPPING

CO\PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**

II B.TECH. - II SEMESTER

		L	T	P	C
23ECE245	**ELECTRONIC CIRCUITS ANALYSIS LAB**	**-**	**-**	**3**	**1.5**

PRE-REQUESITES: Electronic Circuit Analysis

COURSE OBJECTIVES:

1. To understand the biasing of BJT transistor
2. To plot the characteristics of Differential amplifiers, feedback and power amplifiers.
3. To analyze the response of tuned amplifiers and multivibrators.
4. To categorize different oscillator circuits based on the application.
5. To design the electronic circuits for the given specifications and for a given application.

LIST OF EXPERIMENTS: (Minimum 10 Experiments has to be performed)

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 Series – Series feedback amplifier and find the frequency response of it.
6. Design and Analysis of Series – Shunt feedback amplifier and find the frequency response of it.
7. Design and Analysis of Shunt – Series feedback amplifier and find the frequency response of it.
8. Design and Analysis of Shunt – Shunt feedback amplifier and find the frequency response of it.
9. Design and Analysis of Class A power amplifier
10. Design and Analysis of Class AB amplifier
11. Design and Analysis of RC phase shift oscillator
12. Design and Analysis of LC Oscillator
13. Frequency Response of Single Tuned amplifier

Note: At least 10 experiments shall be performed. Both BJT and MOSFET based circuits shall be implemented.

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.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Demonstrate knowledge on biasing , small and large signal BJT amplifier	PO1
CO2	Analyze the results of various small and large signal ampliers	PO2
CO3	Design and testing the small and large signal amlifer and in the hardware	PO3
CO4	Conduct investigation and test the functionality of amplifer and oscillators	PO4
CO5	Select appropriate tools as Multisim PSPICE simulation package tool and procedure to simulate and implement amplifiers and oscillators	PO6
CO6	Follow ethical principles in designing, simulating and implementing circuits	PO8
CO7	Do experiments effectively as an individual and as a member in a group	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments	PO10
CO9	Continue updating their skill related to implementation for various application during their life time	PO12

CO-PO MAPPING

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**3**	**3**	**3**	**-**	**3**