List of Courses Focus on Employability/ Entrepreneurship/ Skill Development

Department : *Pure and applied physics*

Programme Name : Master of Science in Electronics

Academic Year : 2021-22

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
01.	PEPATT1	Mathematical Techniques for Electronics
02.	PEPATT2	Semiconductors Materials & Devices
03.	PEPALT2	Semiconductors Materials & Devices Lab
04.	PEPATT3	Analog and Digital Electronics
05.	PPPALT3	Analog and Digital Electronics Lab
06.	OPNPET1	Applications of Nanotechnology in Electronics
07.	OPNPEL1	Applications of Nanotechnology in Electronics Lab
08.	PEPBTT1	Electromagnetic theory and Wave Propagation
09.	PEPBTT2	IC Fabrication and VLSI Technology
10.	PEPBTT3	Microprocessors and Microcontrollers
11.	PEPBLT3	Microprocessors and Microcontrollers Lab
12.	PEPBTD1	Advanced Communication System-1
13.	PEPBLD1	Analog and Digital Communication System Lab

विभागाध्यक्ष/H.O.D.
शुद्ध एवं अनुप्रयुक्त भौतिकी विभाग
Dept. of Pure & Applied Physics
गुरु घासीदास विश्वविद्यालय
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Scheme and Syllabus

Sem	Course Opted	Course Code	Name of the course	Credit	L:T:P	Internal	External	Total
I	Core-1	PEPATT1	Mathematical Techniques for Electronics	5	4+1+0	30	70	100
	Core -2	PEPATT2	Semiconductors Materials & Devices	3	3+0+0	30	70	100
		PEPALT2	Semiconductors Materials & Devices Lab	2	0+0+2	30	70	100
	Core -3	PEPATT3	Analog and Digital Electronics	3	3+0+0	30	70	100
		PPPALT3	Analog and Digital Electronics Lab	2	0+0+2	30	70	100
	Open Elective		Opted from the pool and offered by other departments	5	5+0+0	30	70	100
	Other if any*							
			TOTAL	**20**				**600**
		Open Elective offered by the Department						
	Open Elective	OPNPET1	Applications of Nanotechnology in Electronics	3	3+0+0	30	70	100
		OPNPEL1	Applications of Nanotechnology in Electronics Lab	2	0+0+2	30	70	100
II	Core-4	PEPBTT1	Electromagnetic theory and Wave Propagation	5	4+1+0	30	70	100
	Core -5	PEPBTT2	IC Fabrication and VLSI Technology	5	4+1+0	30	70	100
	Core -6	PEPBTT3	Microprocessors and Microcontrollers	3	3+0+0	30	70	100
		PEPBLT3	Microprocessors and Microcontrollers Lab	2	0+0+2	30	70	100
	Discipline Specific Elective 1	PEPBTD1	Advanced Communication System-1	3	3+0+0	30	70	100
		PEPBLD1	Analog and Digital Communication System Lab	2	0+0+2	30	70	100
	Other if any*							
			TOTAL	**20**				**900**
III	Core-7	PEPCTT1	Power Semiconductor Devices and Control System	5	4+1+0	30	70	100
	Core-8	PEPCTT2	Sensors and Transducers	5	4+1+0	30	70	100
	Core-9	PEPCTT3	Optoelectronics Devices	3	3+0+0	30	70	100
		PEPCLT3	Optoelectronics Devices Lab	2	0+0+2	30	70	100
	Research Methodology	PEPCTR1#	Research Methodology in Electronics	2	2+0+0	30	70	100
	Discipline Specific elective 2	PEPCTD1	Advanced Communication System-2	3	3+0+0	30	70	100
		PEPCLD1	Advanced Communication System-2 Lab	2	0+0+2	30	70	100
	*Certificate/ FC/UEC			2		30	70	100
	Other if any							
			TOTAL	**22+2***				**700**
IV	Major Project Work With Dissertation	PEPDD01#	Major Project Work With Dissertation	12		30	70	100
	Industrial Training (Internship)	PEPDE01#	Industrial Training in the fields Related to the Programme with Project Report	08		30	70	100
			TOTAL	**20**				**200**

Semester - I

Core -1: Mathematical Techniques for Electronics

Course Code: PEPATT1

Credits = 5 (4+1+0)

Course Objectives:

- Create deep interest in learning mathematics techniques.
- To offer a gentle introduction to the concepts of Laplace transforms, Inverse Laplace transforms, solution of ordinary differential equations using Laplace transform, Fourier series and their properties with applications in real life.

Course outcomes:

The student after undergoing this course will be able to:

- Analyze, identify and solve the problem using Laplace Series.
- Analyze, identify and solve the problems using Fourier Series
- Apply -Transforms, Inverse Z-Transforms and solve Difference Equations.
- To apply the application of Mathematics in Electronics.

Unit I: Laplace Transform: Definition and Properties, Laplace Transform derivatives and integrals, Evaluation of differential equations using Inverse Laplace Transform, Applications of Laplace Transform , Fourier Series & Transform: Definition and Properties, Fourier series in the Interval, Uses of Fourier Series, Fourier sine and cosine transform of Derivatives, Finite Fourier Transform, and Applications of Fourier Transform.

Unit II: Partial differential equations: Homogeneous and non-homogeneous boundary conditions, Solutions by separation of variables and series expansion methods. Laplace, wave and diffusion equations in various coordinate systems. Integral equations: methods and solutions,

Unit III: Mathematical Transforms: Discrete time signal analysis and linear systems , Sampling theorem and applications , Sampling of continuous time signals. z-transform, inverse z-transform, Digital Filters: signal flow graph representation, basic structures for IIR and FIR filters, noise in digital filters, filter design techniques, Transforms: Discrete Fourier Transform (DFT) , properties and Fast Fourier Transforms (FFT)

Unit IV: Mathematical tool for Electrical circuits; Superposition, Thevenin, Norton and Maximum Power Transfer Theorems, Network elements, Network graphs, Nodal and Mesh analysisTime and frequency domain response, Passive filters, Two-port Network Parameters : Z, Y, ABCD and h parameters, Transfer functions, Signal representation, State variable method of circuit analysis, AC circuit analysis, Transient analysis, Zero and Poles, Bode Plots.

Reference Books:

1. Advanced Engineering Mathematics : E Kreyszig (John Wiley & Sons)
2. Higher Engineering Mathematics : Dr. B.S. Grewal, Khanna Publishers, New Delhi.

Core -2: Semiconductor Materials and Devices

Course Code: PEPATT2

Credits = 3 (3+0+0)

Course Objectives

- To provide basic knowledge and concepts of Semiconductor materials and devices.
- It provides a basic background for advanced courses in electronics, optoelectronics and VLSI design.
- To give an appreciation of the role of the physicist in shaping future electronics
- To provide overview of modern low dimensional semiconductor physics.

Course Outcomes

On completion of the course a student will be able to

- Understand major properties of semiconducting materials, explain energy band diagrams and connections with the device structures and properties.
- Holistic view of the latest progress in low-dimensional nano materials for electronic devices.

Unit – I: Introduction to Semiconductor, energy bands in solids, concept of effective mass, density of states, Fermi levels. Extrinsic semiconductors: n and p type doping, Densities of carriers in extrinsic semiconductors and their temperature dependence,

Unit – II: Carrier transport, Conductivity, Mobility and Hall Effect, Diffusion and drift of excess carriers, recombination mechanism, Trapping, Continuity Equation, Diffusion Length.

Unit – III: PN Junction, Diode equation and diode equivalent circuit, Breakdown in diodes, Zener diode, Tunnel diode, Metal semiconductor junction – Ohmic and Schottky contacts, Characteristics and equivalent circuits of JFET, MOSFET.

Unit – IV: Low dimensional semiconductor devices – quantum wells, quantum wires, quantum dots. High Electron Mobility Transistor (HEMT), Solar cells – I-V characteristics, fill factor and efficiency, LED, LCD and flexible display devices. Emerging materials for future Devices: Graphene, Carbon Nano tubes (CNT), ZnO, SiC etc.

Reference Books:

1. Physics of semiconductor Devices, S. M. Sze.
2. Semiconductor Devices, ISBN 0-471-36245-X, Jaspreet Singh,
3. Principles of electronic materials and devices, ISBN 0-07-295791-3, S. O. Kasap,
4. Low Dimensional Semiconductors (M J Kelly Oxford)

Core -2: Semiconductor Materials and Devices Lab

Course Code: PEPALT2

Credits = 2 (0+0+2)

Name of the experiments

1. Measurement of resistivity of sample at various temperatures by four probe method.
2. To calculate the energy band gap of given semiconductor sample.
3. To study the Hall Effect: determine the Hall coefficient, type of semiconductor and carrier concentration in the given semiconductor sample
4. I-V characteristics measurement of a p-n diode/Schottky diode calculate its device Parameters.
5. To study the performance of solar cell.
6. To study characteristics of JFET and its application as switch.
7. To study characteristics of MOSFET and its application.

Core - 3: Analog and Digital Electronics

Course Code: PEPATT3

Credits = 3 (3+0+0)

Course Objectives:

- To study rectifiers, ICs based regulated power supply, Transistor Biasing, FETs, operating point and stability, Amplifiers, and Various types of oscillators.
- To study the basic principles, configurations and practical limitations of op-amp. , to understand the various linear, non-linear applications of op-amp and frequency generators.
- To understand characteristics of flip-flops, Counters Registers A/D and D/A Convertor, memory and their classifications.

Learning Outcomes:

Upon successful completion of this course, students will be able to address following points:

- This course provides the foundation inrectifiers, ICs based regulated power supply, transistor biasing, amplifiers, and various types of oscillators.
- Able understanding and implementation of flip-flops, Counters, Registers, A/D and D/A Convertor, memory.

Unit – I: Rectifiers, Voltage regulated ICs and regulated power supply, Biasing of Bipolar junction transistors andFETs, operating point and stability, Amplifiers, Classification of amplifiers, Concept of feedback,Hartley, Colpitt's and Phase Shift oscillators.

Unit – II: Operational amplifiers (OPAMP) - characteristics, computational applications, comparators, Schmitt trigger, Instrumentation amplifiers, wave shaping circuits, Phase locked loops, Active filters, multivibrators, Voltage to frequency convertors (V/F), frequency to voltage convertors (F/V).

Unit – III: Combinational circuits : Logic Families, Logic Gates, Boolean algebra , minimization techniques :Switching equations, canonical logic forms, sum of product & product of sums, Karnaugh maps, two, three and four variableKarnaugh maps, simplification of expressions, Quine-McCluskeyminimization technique, mixed logic combinational circuits, multipleoutputfunctions.Sequential circuits: multiplexers and demultiplexers.

Unit – IV: Flip-flops, clocked and edge triggeredflipflops, Counters – Ring, Ripple, asynchronous and synchronous counters, counter design with state equations, Registers , serial in serial out shift registers, tristateregistor, timing considerations. A/D and D/AConverter, Sequential PLD, FPGA, Analysis and Design of digital circuits using HDL, Programmable Logic Devices (PLD), flip flops memories.

Reference Books:

1. Millman's Integrated Electronics - Analog and Digital Circuit and Systems.
2. A.P. Malvino, Electronic Principles, Tata Mcgraw Hill Publications.
3. Robert L. Boylestad& Louis Nashelsky, Electronic Devices & Circuit Theory.

Core - 3: Analog and Digital Electronics Lab

Course Code: PEPALT3

Credits = 2 (0+0+2)

Name of the experiments

1. Design some combinational circuits using NAND & NOR Gate.
2. Design circuit Using IC 7400 and 7402 to verify.
3. Study characteristics of FET and MOSFET.
4. Study characteristics of Colpit's oscillator.
5. Experiment based on Operational Amplifier (like adder, subtractor and Others)
6. To Study the characteristics of op- amp as Inverting and non inverting.
7. To Study the characteristics of op- amp as Schmitt trigger & Comprator.
8. Study and designs flip flop.
9. Study and designs of A/D & D/A Convertor.

References:

1. Millman's Integrated Electronics - Analog and Digital Circuit and Systems.
2. Digit al Principles & Application: Malvino& Leach.
3. Digit al electronics: R.P. Jain.

Open Elective: Applications of Nanotechnology in Electronics

Course Code: OPNPET1

Credits = 3 (3+0+0)

Course Objectives

- Foundation knowledge of the nanoscience field
- To bring out the distinct properties such as electronic, optical properties of nanostructures
- To make the students acquire an understanding the nanomaterials and their applications

Learning Outcomes

Upon successful completion of this course, students will be able to address following points:

- Learn about the distinct properties of nanomaterials
- Understand the principles of nanomaterial characterization techniques
- Describe the principle and operation of nanomaterial-based devices

Unit – I: Definition of Nano-science and nano technology, History of nanoscience, Energy band-gap in semiconductors, Fermi level, Donors, acceptors and deep traps, Excitons, Mobility, Conduction electrons, density of states, Zero dimensional (0D), one dimensional (1D) , two dimensional (2D) , three dimensional (3D), Nano-structured materials, Influence of nano over micro/macro.

Unit – II: Properties of Nanomaterials: Size dependence of properties, Optical: Absorption, transmission, Photoluminiscence, Fluoroscence, Phosphorescence, Surface Plasmon Resonance, effect of size of nano particles. Electrical: Conduction mechanisms in 3D (Bulk), 2D (Thin film) and Low dimensional systems.

Unit – III: Type of Nanomaterials: different type of nano materials,Carbon nanotube, Fullerene, Type of CNT: SWNT (Single wall nano tube), Multi wall nano tubes, Graphite and Graphene, metal nano particle silver and gold, ZnO and TiO_2 metal oxides, Semiconductors, Nano-composites,Creating nanoparticles by using software.

Unit – IV: Synthesis of nanomaterials: Combustion method, Sol-gel method, Co-precipitation method. Characterization tools for nanomaterials: X-Ray Diffraction, UV-VIS Spectrophotometer, Spectrofluorophotometer, Scanning Electron Microscopy, Transmission Electron Microscopy.

Reference Books:

1. Introduction to Nanotechnology, Charles P. Poole, Jr., Frank J. Owens, Wiley India (P)Limited New Delhi.
2. Nanoscience and Nanotechnology, K.K. Chattopadhyay, A.N. Banerjee, PHI Learning Private Limited, New Delhi.

Open Elective: Applications of Nanotechnology in Electronics Lab
Course Code: OPNPEL1
Credits = 2 (0+0+2)

Name of the experiments

1. To calculate the energy bandgap of nanoparticle from UV-VIS spectra.
2. To measure the average crystallite size using XRD data of a given nanomaterial.
3. Estimation of lattice strain in nanoparticle by XRD pattern.
4. To calculate the grain size of a material fromSEM micrograph.
5. To analyse the absorption and emission spectrum of a given material.
6. Synthesis of nanomaterial by combustion method.

Semester – II

Core-4: Electromagnetic Theory and Wave Propagation

Course Code: PLPBTT1

Credit: 5 (4+1+0)

Course Objectives:

The course aims to develop

- Ability to understand the propagation of electromagnetic waves in different medium
- Understanding of the Gauge transformation and invariance of the fields
- Mathematical analysis of the sinusoidal linear waves
- Ability to understand the physics involved in the waveguides and resonators
- Understanding of the optical fiber communication

Learning Outcomes:

At the end of this course student will demonstrate the ability to:

- Apply the maxwell's equation to explain the propagation of electromagnetic waves in different medium and their related phenomenon such as skin depth etc.
- Understand the concept of Lorentz and Coulomb Gauge.
- Interpret the natural optical phenomenon by using the concept of transverse nature of electromagnetic waves
- Understand the principles involved in the optical fiber communication

Unit – I: Maxwell's equation in terms of scalar and vector potential, Gauge Transformation, Lorentz and Coulomb Gauge, Retarded potential, Electromagnetic waves in free space, wave propagation in linear medium, propagation of sinusoidal voltages, complex analysis of sinusoidal waves and phasor.

Unit – II: Propagation of electromagnetic waves in isotropic dielectric medium. Propagation of em waves in anisotropic dielectric medium, Fresnel law of normal velocities, propagation of em waves in conducting medium, skin depth, Poynting vector in conducting medium, propagation of em waves in ionized gases, plasma frequency.

Unit – III: Interaction of electromagnetic waves with matter, Fresnel Formulae, Snell's law, Brewster's law, total internal reflection, Production of elliptically and circularly lights. Metallic reflection, Rectangular wave guide, TE mode, TM mode. Cavity resonators-TE and TM mode.

Unit – IV: Wave propagation in the wave guide, Power transmission and attenuation, waveguide current and mode excitation, Optical Fiber, Optical fiber transmission modes, Losses in fiber, measurement of fiber characteristics, introduction to fiber optical communication system.

Reference Books:

1. Principles of Electromagnetics by M.N.O. Sadiku and S.V. Kulkarni
2. Engineering electromagnetic by Hayt and Buck
3. Introduction to electrodynamics by David J. Griffiths

Core -5: IC Fabrication and VLSI Technology

Course Code: PEPBTT2

Credit: 5 (4+1+0)

Course Objectives:

The course aims to develop an understanding of:

- Know the physics of semiconductor junctions, metal-semiconductor junctions and metal-insulator-semiconductor junctions.
- Know the physics and application of semiconductor hetero junctions and quantum-confined structures.

Learning Outcomes:

Upon successful completion of this course, students will be able to address following points:

- To get understanding of device fabrication methods
- Understands the VLSI technology
- Understanding the IC Technology

Unit – I: Clean room technology - Clean room concept – Growth of single crystal Si , surface contamination, cleaning & etching. (Laboratory Practices : Cleaning of p-type & n-type Si-wafer by solvent method & RCA cleaning) Oxidation – Growth mechanism and kinetic oxidation, oxidation techniques and systems, oxide properties, oxide induced defects, charactrisation of oxide films, Use of thermal oxide and CVD oxide; growth and properties of dry and wet oxide, dopant distribution, oxide quality; (Laboratory Practices : Fabrication of MOS capacitor)

Unit – II: Solid State Diffusion – Fick's equation, atomic diffusion mechanisms, measurement techniques, diffusion in polysilicon and silicon di-oxide diffusion systems. Ion implantation – Range theory, Equipments, annealing, shallow junction, high energy implementation. Lithography – Optical lithography, Some Advanced lithographic techniques. Physical Vapour Deposition – APCVD, Plasma CVD, MOCVD. Metallisation - Different types of metallisation, uses & desired properties. VLSI Process integration.

Unit – III: Materials For Integrated Circuits and Fabrication Technology: Classification of IC's, Electronic grade silicon, Silicon shaping lapping polishing and wafer preparation, Vapour phase epitaxy, Molecular beam epitaxy, Optical lithography, Photomask, Photoresist and process, Limitation of optical Lithography, Idea of electron and X-ray Lithography, Wet chemical etching, reactive plasma etching.

Unit – IV: Microelectronic Fabrication: Fabrication of mono lithic diodes, Fabrication of integrated transistors, idea of burried layer fabrication, Monolithic circuit layout and design rule, Isolation methods, Monolithic FET, MOSFET, Processing idea of HEMT (High Electron Mobility transistor), CCD, MOS integrated circuit, Large and medium scale integrated, Hybrid Integrated circuit.

Reference Books:

1. Integrated Electronics : Milliman and Taub
2. Semiconductor Devices Physics and Technology, Author: Sze, S.M.; Notes: Wiley, 1985
3. Electrical and Electronic Engineering Series VLSI Technology, Author: Sze, S.M. Notes: McgrawHill International Editions

Core -6: Microprocessors and Microcontrollers

Course Code: PEPBTT3

Credit: 3 (3+0+0)

Course Objectives:

The course aims to develop an understanding of:

- The difference between microprocessor and microcontrollers
- Their architecture including designed, memory organizing, addressing modes, timing
- Data moving and transferring
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Learning Outcomes:

After completion of this syllabus, students are able to understand:

- The difference between microprocessor and microcontrollers and their architecture.
- To write the programs and load the data on registers and perform the arithmetic and logical operations.

Unit – I: 8086 Architecture and Programming: 8086 Architecture – Min. Mode, Max.Mode – Software Model – Segmentation – Segmentation of address – Pipe line Processing. Addressing Modes – Instruction Set- Constructing Machine Code – Instruction Templates for MOV Instruction– Data Transfer Instructions– Arithmetic, Logic, Shift, rotate instructions Flag Control instructions- Compare, Jump Instructions– Loop and String instructions -Assembly programs- Block move, Sorting, Averaging, Factorial – Code Conversion : Binary to BCD, BCD to Binary.

Unit – II: 8051 Microcontroller Hardware Introduction – Features of 8051 – 8051 Microcontroller Hardware : Pin-out of 8051, Central Processing Unit (CPU), Internal RAM, Internal ROM, Register set of 8051 – Memory organization of 8051 – Input / Output pins, Ports and Circuits – External data memory and Program memory : External program memory, External data memory.

Unit – III: 8051 Instruction Set And Assembly Language Programming Addressing modes – Data moving (Data transfer) instructions : Instructions to Access external data memory, external ROM / program memory, PUSH and POP instructions, Data exchange instructions – Logical instructions : byte and bit level logical operations, Rotate and swap operations – Arithmetic instructions : Flags, Incrementing and decrementing, Addition, Subtraction, Multiplication and division, Decimal arithmetic – Jump and CALL instructions : Jump and Call program range, Jump, CALL and subroutines – Programming.

Unit – IV: Interfacing to External World Interfacing keyboard: Simple keyboard interface, Matrix keyboard interface – Interfacing displays: Interfacing seven segment LED displays, Interfacing LCD display – Interfacing DAC to 8051– Interfacing ADC to 8051 – Interfacing sensors – Interfacing stepper motor.

REFERENCE BOOKS:

1. A. P. Godse and D. A. Godse, “Microprocessors & its Applications”, Technical Publications, Pune,
2. Kenneth Ayala, “The 8051 Microcontroller”, Third Edition, Delmar Cengage Learning, 2005.
3. Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D.McKinlay, “The 8051 Microcontroller and Embedded Systems”, Second Edition, Pearson Education 2008.

Core -6: Microprocessors and Microcontrollers Lab

Course Code: PEPBLT3

Credit: 2 (0+0+2)

Name of the experiments

1. Write an assembly language program to multiply two 16-bit hexadecimal numbers.
2. Write an assembly language program to convert a 16-bit hexadecimal numbers to decimal number
3. To write a language program to generate Fibonacci series.
4. To study working of IC 8086 (interfacing experiment)
5. Write an assembly language program to sort hexadecimal numbers in descending order.
6. Generation of Fibonacci series. Micro controller 8051
7. Addition, subtraction, multiplication and division of two 8-bit numbers.
8. Sum of a series of 8-bit numbers, average of N numbers.
9. Factorial of number, Fibonacci series of N terms.
10. Sorting in ascending and descending order – Picking up smallest and largest number

DSE 1: Advanced Communication System-1
Course Code: PLPBTD1
Credit: 3 (3+0+0)
Course Objectives:
The course aims:

- To understands the basics of Information theory, Source coding techniques and calculate Entropy.
- To study Data communication basics such as TCP/IP and the network management concepts.
- To understand various modulation and multiplexing mechanisms.

Learning Outcomes:
Upon successful completion of this course, students will be able to address following points:

- How information is measured in terms of probability and entropy.
- An overview of the concepts and fundamentals of data communication and computer networks.

Unit – I: Introduction to Information and Coding Theories-Information Theory: information measures, Shannon entropy, differential entropy, mutual information, capacity theorem for point-to-point channels with discrete and continuous alphabets.

Unit – II: Introduction to data communication - Introduction to data communication, layered network architecture (OSI and TCP/IP), Public Telephone Network, Cellular Telephone system, data communication codes, error detection and error control, Modems, LAN topologies, Division Multiplexing (WDM) and its network implementation

Unit – III: Mobile Communication elements and system design - Introduction to Cellular Mobile System - Performance criteria - uniqueness of mobile radio environment - operation of cellular systems- Hexagonal shaped cells - Analog and Digital Cellular systems- General description of the problem - concept of frequency channels -Co-channel Interference Reduction Factor -desired C/I from a normal case in a omnidirectional Antenna system - Cell splitting, consideration of the components of Cellular system

Unit – IV: Satellite communication-Introduction: Orbital mechanics and launching, earth station and satellite sub systems, satellite link: design and analysis, multiplexing techniques, multiple accesses for satellite links: FDMA, TDMA CDMA and DAMA, propagation effects, DBS-TV, GPS. VSAT: Network architecture, access control protocol and link analysis.

Reference Books:

1. Communication Systems" by B P Lathi.
2. Communication Systems" by A B Carlson.
3. Communication Systems: Analog and Digital" by R P Singh and S Sapre

DSE 1: Advanced Communication System I Lab

Course Code: PEPBLD1

Credit: 2 (0+0+2)

Name of the experiments

1. Study the sample signal and sample hold signal and its reconstructions.
2. ASK /FSK/ PSK generation and detection
3. Study of Frequency Modulation using Reactance Modulator.
4. Study of Frequency Modulation using Varactor modulator.
5. Study the operation of Quadrature Detector.
6. Study the operation of Detuned Resonance Detector.
7. Study the operation of Foster - Seeley Detector
8. Study the operation of Ratio Detector
9. Study the FM transmitter and receiver.
10. Study the AM transmitter and receiver.