DEPARTMENT OF PURE AND APPLIED PHYSICS
B. Sc. (Electronics) Course structure under NEP-2020
Academic year 2023 – 2024

Sem.	Courses	Course Code	Number of courses	Level	Credits	Credits (L+T+P)	Int. Marks	Ext. Marks	Total
1	Major-I	PLUATT1	Basic Circuit Theory &Network Analysis	2	3	(3+0+0)	30	70	100
		PLUATL1	Basic Circuit Theory & Network Analysis Lab		1	(0+0+1)	30	70	100
	Minor-I		Opted from the Pool Course offered by University	2	4		30	70	100
	Multidisciplinary		Opted from the Pool Course offered by University	1	3		30	70	100
	AEC		Opted from the Pool Course offered by University	1	2		30	70	100
	SEC		Opted from the Pool Course offered by University	1	3		30	70	100
	VAC-1		Opted from the Pool Course offered by University	1	2		30	70	100
	VAC-2		Opted from the Pool Course offered by University	1	2		30	70	100
			Total		**20**				**800**
2	Major-II	PLUBTT1	Semiconductor Physics & Devices	2	3	(3+0+0)	30	70	100
		PLUBTL1	Semiconductor Physics & Devices Lab		1	(0+0+1)	30	70	100
	Minor-II		Opted from the Pool Course offered by University	2	4		30	70	100
	Multidisciplinary		Opted from the Pool Course offered by University	1	3		30	70	100
	AEC		Opted from the Pool Course offered by University	1	2		30	70	100
	SEC		Opted from the Pool Course offered by University	1	3		30	70	100
	VAC-1		Opted from the Pool Course offered by University	1	2		30	70	100
	VAC-2		Opted from the Pool Course offered by University	1	2		30	70	100
			Total		**20**				**800**
3	Major-III	PLUCTT1	Digital Electronics	3	3	(3+0+0)	30	70	100
		PLUCTL1	Digital Electronics Lab		1	(0+0+1)	30	70	100
	Major-IV	PLUCTT2	C Programming and Data Structures	3	3	(3+0+0)	30	70	100
		PLUCTL2	C Programming and Data Structures Lab		1	(0+0+1)	30	70	100
	Minor-III		Opted from the Pool	3	4		30	70	100

			Course offered by University						
	Multidisciplinary		Opted from the Pool Course offered by University	1	3		30	70	100
	AEC		Opted from the Pool Course offered by University	1	2		30	70	100
	SEC		Opted from the Pool Course offered by University	1	3		30	70	100
			Total		**20**				**800**
4	Major-V	PLUDTT1	Mathematical Techniques for Electronics	3	3	(3+0+0)	30	70	100
		PLUDTL1	Mathematical Techniques for Electronics Lab		2	(0+0+2)	30	70	100
	Major-VI	PLUDTT2	Electronic Circuit	3	3	(3+0+0)	30	70	100
		PLUDTL2	Electronic Circuit Lab		2	(0+0+2)	30	70	100
	Major-VII	PLUDTT3	Signals & Systems	3	4	(3+1+0)	30	70	100
	Minor-IV		Opted from the Pool Course offered by University	3	4		30	70	100
	AEC		Opted from the Pool Course offered by University	1	2		30	70	100
			Total		**20**				**700**
5	Major-VIII	PLUETT1	Operational Amplifiers and Applications	4	3	(3+0+0)	30	70	100
		PLUETL1	Operational Amplifiers and Applications lab		2	(0+0+2)	30	70	100
	Major-IX	PLUETT2	Electronic Instrumentation	4	4	(3+1+0)	30	70	100
		PLUETL2	Electronic Instrumentation Lab		1	(0+0+1)	30	70	100
	Major-X	PLUETT3	Electromagnetic Theory	4	5	(4+1+0)	30	70	100
	Minor-V		Opted from the Pool Course offered by University	4	4		30	70	100
	Internship				2		30	70	100
			Total		**21**				**700**
6	Major-XI	PLUFTT1	Microprocessor and Micro controller	4	3	(3+0+0)	30	70	100
		PLUFTL1	Microprocessor and Micro controller lab		2	(0+0+2)	30	70	100
	Major-XII	PLUFTT2	Semiconductor Fabrication & Characterization	4	5	(4+1+0)	30	70	100
	Major-XIII	PLUFTT3	Communication Electronics	4	3	(3+0+0)	30	70	100
		PLUFTL3	Communication Electronics lab		2	(0+0+2)	30	70	100
	Minor-VI		Opted from the Pool Course offered by University	4	4		30	70	100
			Total		**19**				**600**
7(Hons. With Research)	Major-XIV	PLUGTT1	Photonic Devices and Power Electronics	5	4	(4+0+0)	30	70	100
		PLUGTL1	Photonic Devices and Power Electronics Lab		1	(0+0+1)	30	70	100
	Major-XV	PLUGTT2	Nano electronics	5	3	(3+0+0)	30	70	100
		PLUGTL2	Nano electronics Lab		2	(0+0+2)	30	70	100
	Major-XVI	PLUGTT3	IC Fabrication and VLSI Technology	5	5	(4+1+0)	30	70	100
	Minor-VII		Opted from the Pool	5	4		30	70	100

			Course offered by University						
			Total		**19**				**600**
8(Hons. With Research)	Major-XVII	PLUHTT1	Numerical Techniques	5	4	(4+0+0)	30	70	100
		PLUHTL1	Numerical Techniques lab		1	(0+0+1)	30	70	100
	Minor-VIII	PLUHTT2	Opted from the Pool Course offered by University	5	4		30	70	100
	Research project/dissertation	PPUHTD1	Dissertation/ project work followed by seminar		12		30	70	100
			Total		**21**				**600**
7.(Hons.)	Major-XIV	PLUGTT1	Photonic Devices and Power Electronics	5	4	(4+0+0)	30	70	100
		PLUGTL1	Photonic Devices and Power Electronics Lab		1	(0+0+1)	30	70	100
	Major-XV	PLUGTT2	Nano electronics	5	3	(3+0+0)	30	70	100
		PLUGTL2	Nano electronics Lab		2	(0+0+2)	30	70	100
	Major-XVI	PLUGTT3	IC Fabrication and VLSI Technology	5	5	3+1+1(L+T+P)	30	70	100
	Minor-VII		Opted from the Pool Course offered by University	5	4		30	70	100
	Seminar-1				1		30	70	100
			Total		**20**				**700**
8.(Hons.)	Major-XVII	PLUHTT1	Numerical Techniques	5	4	(4+0+0)	30	70	100
		PLUHTL1	Numerical Techniques Lab		1	(0+0+1)	30	70	100
	Major-XVIII	PLUHTT2	Sensors & Transducers	5	4	(4+0+0)	30	70	100
		PLUHTL2	Sensors & Transducers Lab		1	(0+0+1)	30	70	100
	Minor-VIII		Opted from the Pool Course offered by University	5	4		30	70	100
	Minor-IX		Opted from the Pool Course offered by University	5	4		30	70	100
	Seminar-2				2		30	70	100
			Total		**20**				**700**

PHY- Physics, L-Lecture, T- Tutorial, P-Practical

Courses Offered by the Department of Pure & Applied Physics/School

Sem.	Courses	Course Code	Name of courses	Level	Credits	Credits (L+T+P)	Int. Marks	Ext. Marks	Total
I	Minor-I Offered by the Department	PLUATG1	Basic Circuit Theory and Network Analysis	2	3	(3+0+0)	30	70	100
		PLUALG1	Basic Circuit Theory and Network Analysis Lab		1	(0+0+1)	30	70	100

	Multidisciplinary Offered by the School of Physical Sciences and Natural Sciences	PPUATM1	Conceptual Understanding of Physical Science – I	1	3	(2+1+0)	30	70	100
	SEC Offered by the Department	PLUATS1	Network Circuit Analysis	1	3	(2+0+1)	30	70	100
II	Minor-II Offered by the Department	PLUBTG2	Semiconductor Devices	2	3	(3+0+0)	30	70	100
		PLUBLG2	Semiconductor Devices Lab		1	(0+0+1)	30	70	100
	Multidisciplinary Offered by the School of Physical Sciences and Natural Sciences			1	3	(2+1+0)	30	70	100
	SEC Offered by the Department	PLUBTS2	Simulation and Design of Digital Circuits Components	1	3	(2+0+1)	30	70	100

PHY- Physics, L-Lecture, T- Tutorial, P-Practical

DEPARTMENT OF PURE AND APPLIED PHYSICS
B. Sc. (Electronics) PO-PSO under NEP-2020
Academic year 2023 – 2024

Programme Outcomes: B. Sc. (Electronics)

PO1: Knowledge: Develop a deeper understanding and gain extensive knowledge in various areas of basic and applied electronics.
PO2: Problem Solving Ability: To enhance problem solving ability in case of different problems related to fundamental and technologically oriented electronics.
PO3: Tools & Techniques: Learn various tools and techniques for design, synthesis, optimization of circuits and devices.
PO4: Investigation: Learn to investigate complex problems relate to circuit optimization based on available data and to apply it to synthesize various circuits and systems.
PO5: Society & Environment: Apply the knowledge to asses societal, health, safety, legal and cultural issues and understand the importance of environment for sustainable development.
PO6: Communication and Presentation Skills: Acquire the strong communication and presentation capabilities related to scientific/technological or other social issues.
PO7: Development: Layout design circuit synthesis, optimization and realization as well as design synthesis and optimization of devices.
PO8: Automation: To Learn automation of the machines and systems using microprocessors and microcontrollers.
PO9: Independent & Team Work: Enhance the critical thinking ability, become inquisitive and handle the problems independently as well as manage with team work.
PO10: Carrier: Gain motivations to-opt for M. Sc./M. Tech. in electronics or related areas and apply for various job positions in industries, research & academic institutions.
PO11: Ethics: Apply ethical principles in professional as well as daily life and become persons of integrity and responsibility.
PO12: Life-long Learning: Strive for novel ways of thinking and develop life-long learning attitude.

Programme Specific Outcomes:

PSO1: To attain fundamental knowledge of mathematical methods in electronics, basic circuit theory, network analysis, design and synthesis of circuits using VHDL tools.
PSO2: To acquire basic idea about coding using high level languages, electronic circuits using various components and basics of semiconductor devices along with applied physics.
PSO3: Acquire skills about working of OP AMPS, signals and systems, electronic instrumentation and to apply microprocessors and microcontrollers for automation of the instruments and machines.
PSO4: Gain skills about semiconductors devices, fabrication and characterization of different types of devices. Concepts of simulation, design of digital circuits**,** network circuit analysis and organic electronics**.**
PSO5: Students equipped to familiar with the use of electronics in daily life for the smooth operation/functioning of various electronic components and systems required for domestic and industrial purposes.
PSO6: To train the students regarding design of digital circuits and simulation of various components/devices used in different electronics based system development.

Semester - I

Major-I: Basic Circuit Theory and Network Analysis
Course Code: PLUATT1 **Credits = 3 (3+0+0)**
Course Objectives:

- The objective of the course is that the student acquires the knowledge of basics of electrical network.
- To gain the knowledge and critical analysis of electrical circuit using network theorem.

Learning Outcomes:

- Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using different network theorems.
- Student will understand the resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.

Unit – I: Circuit Analysis: Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis, Star-Delta Conversion.

Unit – II: DC Transient Analysis: RC Circuit- Charging and discharging with initial charge, RL Circuit with Initial Current, Time Constant, RL and RC Circuits, DC Response of Series RLC Circuits, Complex Numbers for AC Circuits

Unit – III: AC Circuit Analysis: Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Power in AC Circuits &Power Factor.Sinusoidal Circuit Analysis for RL, RC and RLC Circuits.Resonance in Series and Parallel RLC Circuits, Frequency Response of Series and Parallel RLC Circuits, Quality (Q) Factor and Bandwidth, Low Pass Filter, High Pass Filter, Band Pass Filter and Band Stop Filter.

Unit – IV: Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Millman's Theorem, Maximum Power Transfer Theorem, Two Port Networks: Impedance (Z) Parameters, Admittance (Y) Parameters, Transmission (ABCD) Parameters.

Reference Books:

1. S. A. Nasar, Electric Circuits, Schaum's outline series, Tata McGraw Hill (2004).
2. Electrical Circuits, M. Nahvi and J. Edminister, Schaum's Outline Series, Tata McGraw-Hill.(2005).
3. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)
4. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill(2005).
5. Alexander and M. Sadiku, Fundamentals of Electric Circuits , McGraw Hill (2008)
6. Grob's Basic Electronics, 11th ed., Mitchel E. Schultz, McGraw Hill.

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	-	2	-	-	1	-	-	3	-	2	3	-	-	-	1	-
CO2	3	3	-	2	-	-	1	-	-	3	-	2	3	-	-	-	1	-

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Major-I Lab :Basic Circuit Theory and Network Analysis Lab
Course Code: PLUATL1 **Credits = 1 (0+0+1)**
Name of Experiments

1. Verification of Kirchhoff's Law.
2. Verification of Norton's theorem.
3. Verification of Thevenin's Theorem.
4. Verification of Superposition Theorem.

Minor-I: Basic Circuit Theory and Network Analysis
Course Code:PLUATG1 **Credits = 3(3+0+0)**
Course Objectives:

- The objective of the course is that the student acquires the knowledge of basics of electrical network.
- To gain the knowledge and critical analysis of electrical circuit using network theorem.

Course Outcomes:

- Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using different network theorems.
- Student will understand the resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.

Unit – I: Electricity: Charge, Negative and Positive Polarities, Voltage, Current, Closed and open Circuit Electrical components, resistance, capacitor, inductor, etc, and electric power.

Unit – II: Circuit Analysis: Ohms law, series and parallel circuits, Kirchhoff's Current Law (KCL), Kirchhoff's Voltage Law (KVL), Node Analysis, Mesh Analysis. DC Transient Analysis.

Unit – III: AC Circuit Analysis: Sinusoidal Voltage and Current, Definition of Instantaneous, Peak, Peak to Peak, Root Mean Square and Average Values. Power in AC Circuits, Sinusoidal Circuit Analysis, Resonance Circuits

Unit – IV: Network Theorems: Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Reciprocity Theorem, Maximum Power Transfer Theorem.

Reference Books:

1. S. A. Nasar, Electric Circuits, Schaum's outline series, Tata McGraw Hill (2004).
2. Electrical Circuits, M. Nahvi and J. Edminister, Schaum's Outline Series, Tata McGraw-Hill.(2005).
3. Robert L. Boylestad, Essentials of Circuit Analysis, Pearson Education (2004)
4. W. H. Hayt, J. E. Kemmerly, S. M. Durbin, Engineering Circuit Analysis, Tata McGraw Hill (2005).
5. Alexander and M. Sadiku, Fundamentals of Electric Circuits , McGraw Hill (2008)
6. Grob's Basic Electronics, 11th ed., Mitchel E. Schultz, McGraw Hill.

Course Outcomes and their mapping with Programme Outcomes:

	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	-	2	-	-	1	-	-	3	-	2	3	-	-	-	1	-
CO2	3	3	-	2	-	-	1	-	-	3	-	2	3	-	-	-	1	-

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Minor-I Lab: Basic Circuit Theory and Network Analysis Lab
Course Code: PLUALG1 **Credits = 1 (0+0+1)**
Name of Experiments

1. Verification of Kirchhoff's Law.
2. Verification of Norton's theorem.
3. Verification of Thevenin's Theorem.
4. Verification of Superposition Theorem.

SEC-1 : Network Circuit Analysis
Course Code: PLUATS1 **Credits = 3 (2+0+1)**

Course Objectives:|

- The objective of the course is that thes tudent acquires the knowledge of basics electrical network.
- To gain the knowledge and critical analysis of electrical circuit with network theorem.

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

- Understand the basic concepts, basic laws and methods of analysis of electrical networks
- Reduce the complexity of network using different network theorems.

Unit-I
Analysis of Electrical Network: Active and passive element of circuit, Resistance colour code,Review of series, parallel and series-parallel circuit,Voltage divider and current divider circuit,Ground Connections in Electrical Network, Short circuit and open circuit, Electrical power, power in short and open circuit.

Unit-II
Electrical Network: Concept of Branch, Node,Loop, Mesh and Super-Mesh,Kirchhoff's CurrentLaw(KCL),Kirchhoff'sVoltageLaw(KVL),NodeAnalysis,MeshAnalysis,Star-Delta Conversion.

Unit-III
Network Theorems: Concept of Ideal and practical Sources, Thevenin theorem,Norton theorem, Thevenin Norton conversion, Superposition theorem, Maximum Power Transfer theorem.

Reference Books

1. Grob's Basic Electronics, 11th ed.,Mitchel E.Schultz,McGraw Hill.
2. Electronic Device andCircuit Theory, Boylestad& Nashelsky, 11th ed. Pearson Publication.
3.Engineering Circuit Analysis J David Irwin et alWileyIndia10th Edition,2014
4.Electric Circuits Mahmood Nahvi McGraw Hi ll 5th Edition,2009
5.Introduction to Electric Circuits Richard C Dorf and James A Svoboda Wiley 9th Edition, 2015
6.Circuit Analysis; Theory and Practice Allan H Robbins WilhelmC Miller Cengage 5th Edition, 2013 project managers.

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	-	1	-	-	-	-	-	3	1	2	3	-	-	2	3	-
CO2	3	3	-	2	-	-	-	-	2	3	1	2	3	-	-	2	3	-
CO3	3	3	3	1	-	-	2	-	2	3	1	2	3	-	-	2	3	-

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Lab Work for Network Circuit Analysis

1. Use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c) DC Current, (d) Capacitance and (e) Checking electrical fuses.
2. Soldering of Electrical wires and Networks.
3. To verify the Open Circuit Voltage, Thevenin's resistance and Thevenin Theorems.

Semester -II

Major-II : Semiconductor Physics & Devices
Course Code : PLUBTT1 **Credit: 3 (3+0+0)**
Course Objective:

- This module introduces to the students some of the important semiconductor devices along with the underlying semiconductor physics. The module makes the students familiar with the working principles of major semiconductor diode, bipolar transistor, field-effect transistor devices, negative-resistance and power devices and photonic devices.
- Understand the fundamental principles and applications of modern electronic and optoelectronic semiconductor device.
- Understanding the connection between theory and practical as well as to make familiar with Experiments.

Course Outcomes: After completion of this course, students will be able to

- Get an understanding about the working principles and characteristics of different types of semiconductor devices — p-n junction diodes, bi-polar transistors, MOSFETs, MESFETs, tunnel diodes, photo-detectors, LEDs and solar cells

Unit – I: Semiconductor Basics: Carrier Concentration at Normal Equilibrium in Intrinsic Semiconductors, Fermi Level for Intrinsic & Extrinsic Semiconductors, Donors, Acceptors, Carrier Drift, Mobility, Resistivity, Hall Effect, Diffusion Process, Einstein Relation, Continuity Equation.

Unit – II: P-N Junction Diode: Formation of Depletion Layer, Space Charge at a Junction, Derivation of Electrostatic Potential Difference at Thermal Equilibrium, Concept of Linearly Graded and an abrupt Junction, Depletion Width and Depletion Capacitance of an Abrupt Junction. Derivation of Diode Equation and I-V characteristics, Zener and Avalanche Junction Breakdown Mechanism. Tunnel diode, varactor diode: circuit symbol, characteristics, applications**.**

Unit – III: Bipolar Junction Transistors (BJT): PNP and NPN Transistors, Basic Transistor Action, Emitter Efficiency, Current Gain, Energy Band Diagram of Transistor in Thermal Equilibrium, Quantitative Modes of operation, Input and Output Characteristics of CB, CE and CC Configurations. Metal Semiconductor Junctions:

Unit – IV: Field Effect Transistors: JFET, Construction, Idea of Channel Formation, Pinch-Off and Saturation Voltage, Current-Voltage Output Characteristics. MOSFET, types of MOSFETs, Circuit symbols, Working and Characteristic curves of Depletion type MOSFET (both N-channel and P-Channel) and Enhancement type MOSFET (both N channel and P channel).Power Devices: UJT, Basic construction and working, Equivalent circuit, Characteristics. SCR, Construction, Working and Characteristics,

Reference Books:

1. S. M. Sze, Semiconductor Devices: Physics and Technology, 2nd Edition, Wiley India edition (2002).
2. Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006)
3. Dennis Le Croissette, Transistors, Pearson Education (1989)
4. Jasprit Singh, Semiconductor Devices: Basic Principles, John Wiley and Sons (2001)
5. Kanaan Kano, Semiconductor Devices, Pearson Education (2004)
6. Robert F. Pierret, Semiconductor Device Fundamentals, Pearson Education (2006)

Course Outcomes and their mapping with Programme Outcomes:

	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-
CO2	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-
CO3	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Major-II: Semiconductor Physics & Devices Lab
Course Code:PLUBTL1. **Credits = 1(0+0+1)**

1. Study of the PN junction diode .
2. Study of Zener diode.
3.Study of the transistor characteristics
4. Study of MOSFET.

Minor-II: Semiconductor Devices
Course Code : PLUBTG2. **Credits = 3(3+0+0)**

Course objective:
The course aims to develop an understanding of:

- How to analyze electrical filters, applications of diode diodes, and principle of power supply.
- To learn basic of different transistor biasing.
- To understand basic construction of feedback circuits and their application in Oscillators.
- To understand basic amplifier and oscillator circuits and their application.

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

- Students will the working principle of power supply and it component such as half as well as full wave rectifiers, of regulated power supply.
- Students learn the concept of feedback and oscillators such as Phase shift, Colpitt, and Hartley.
- To learn the Biasing of MOSFET and characteristics of FET in common source mode,

Unit-1: Diode and Diode Circuits: Semiconductors, PN Junction Diode, I-V Characteristics, Ideal diode, Diode Equations, Rectifiers: HWR, FWR (center tapped and bridge). Filters: types, circuit diagram and explanation of shunt capacitor filter with waveforms. Zener diode and I-V characteristics, Voltage regulator circuit diagram.

Unit-2: Bipolar Junction Transistor: PNP and NPN Transistors, Basic Transistor Action, Input and Output Characteristics of CE, CB transistor and Hybrid parameters, DC load line.

Unit – 3: Feedback Amplifiers: Concept of feedback, negative and positive feedback, Barkhausen criteria for oscillations, advantages and disadvantages of negative feedback, Study of phase shift oscillator, Colpitts oscillator, and Hartley oscillator.

Unit-4: JFET and MOSFET Circuits: JFET, Construction, Idea of Channel Formation, Pinch-Off and Saturation Voltage, MOSFET, types of MOSFETs, Working and Characteristic curves of Depletion type MOSFET (both N-channel and P-Channel).

References:

1. Electronic Devices and circuit theory, Robert Boylstead and Louis Nashelsky, 9th Edition, 2013, PHI.
2. Electronic devices, David A Bell, Reston Publishing Company
3. D. L. Schilling and C. Belove, Electronic Circuits: Discrete and Integrated, Tata McGraw Hill (2002)
4. Donald A. Neamen, Electronic Circuit Analysis and Design, Tata McGraw Hill (2002)
5. J. Millman and C. C. Halkias, Integrated Electronics, Tata McGraw Hill(2001)J. R. C. Jaegar and T. N. Blalock, Microelectronic Circuit Design, Tata McGraw Hill(2010)
6. J. J. Cathey, 2000 Solved Problems in Electronics, Schaum's outline Series, Tata McGraw Hill (1991)

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-
CO2	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-
CO3	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-
CO4	3	3	1	2	-	-	-	-	-	3	-	2	3	3	-	3	1	-

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Minor-II: Semiconductor Devices Lab
Course Code:PLUBLG2. **Credits = 1(0+0+1)**

Name of Experiments

1. Study of the half wave rectifier and Full wave rectifier.
2. Study of Fixed Bias, Voltage divider bias Feedback configuration for transistors.
3. Study of the Colpitt's Oscillator.
4. Study of the Hartley's Oscillator.
5. Study of the Phase Shift Oscillator

SEC: Simulation and Design of Digital Circuits Components **Credit = 3(2+0+1)**

Course Code: PLUBTS2

Course Objectives:

- To acquaint students with various basic digital gates used in digital system and develop logical circuits using Boolean gates, construction of various logic circuits using basic gates.
- Basic knowledge of working on Personal Computer and Basic Computer Skill Lab.
- To impart practical workingknowledge of Simulation and Analysis of digital circuits using MATLAB and/or SCILAB.

Learning Outcomes: On successful Completion of the course, students will be able to:

1. Understand the main features and importance of the MATLAB/SCI LAB mathematical programming environment.
2. Apply working knowledge of MATLAB/SCI LAB package to simulate and solve Digital Electronics circuits and Applications.
3. Solve, Simulate and Analyze various Electronics Digital circuits.
4. To study designing aspects of digital circuits.
5. Design, simulate, and practical verification of digital circuits.

Unit I: Voltage, Current, Resistance, and Power. Ohm's law, Series, parallel and series-parallel combinations.AC and DC Electricity.Familiarization with multimeter, voltmeter and ammeter.

Unit II : Use of Multimeter. Soldering of electrical circuits having discrete components (R, L, C, Diode) and ICs on PCB. Operation of oscilloscope.

Unit III : Logic Circuits ,OR Gate, Equivalent circuits of an OR Gate, AND Gate , Equivalent circuits of an AND Gate, NOT Gate, Equivalent circuits of an NOT Gate, Exclusive OR Gate, , NOR Gate as Universal Gate, NAND Gate, NAND Gate as Universal Gate, XNOR Gate.

Unit IV : Adder and Subtractor, Half Adder, Full Adder, Half Subtractor,FullSubtractor, Half Adder using NAND Gate, Full Adder using NAND Gate, Comparator.

Reference Books :

1. Electrical Circuits, K.A. Smith and R.E. Alley
2. Modern Digital Electronics by R.P.Jain
3. Digital Electronics by Malvino and Leech
4. Digital Signal Processing with Examples in MATLAB by Samuel D. Strearns and Don R. Hush
5. Digital Signal Processing using MATLAB by Vinay K. Ingle and Johan G. Proakis

CO	PO												PSO					
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	1	-	-	-	-	-	3	-	2	3	3	-	3	1	1
CO2	3	3	1	1	-	-	-	-	-	3	-	2	3	3	-	3	1	1
CO3	3	3	1	1	-	-	-	-	-	3	-	2	3	3	-	3	1	1

Weightage: 1-Sightly; 2-Moderately; 3-Strongly

Laboratory course of ACCT

1. Design the OR, AND &NOT Gate circuits using software and Verify with experiments
2. Design the NAND Gate circuits using software and Verify with experiments.
3. Design the NOR Gate circuits using software and Verify with experiments.
4. Design the Half Adder using NAND Gate using software and Verify with experiments.
5. Design the Full Adder using NAND Gate using software and Verify with experiments