IPS Academy, Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

Scheme Based on AICTE Flexible Curricula (B. Tech)

Electrical and Electronics Engineering Department

(For Batches admitted in 2022-23)

III Semester

w.e.f. July 2023

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours/ Week			Total Credits
				Theory			Practical			L	T	P	
				End Sem.	Mid Sem. Exam	Quiz/ Assignment	End Sem.	Lab Work & Sessional					
1	BSC-MA04 (a)	BSC	Numerical Method and Transform Calculus	60	25	15	-	-	100	2	1	-	3
2	PCC-EE01	PCC	Electrical Circuit Analysis	60	25	15	-	-	100	2	1	-	3
3	PCC-EE02	PCC	Analog Electronics	60	25	15	-	-	100	2	1	-	3
4	PCC-EE03	PCC	Instrumentation and Automation	60	25	15	-	-	100	3	0	-	3
5	PCC-EE04	PCC	Digital Electronics and Logic Design	60	25	15	-	-	100	3	0	-	3
6	HSMC-HS03	HSMC	Innovation and Creativity	-	-	-	-	100	100	1	-	-	1
7	LC-EE01(P)	LC	Electrical Circuit Analysis Lab	-	-	-	60	40	100	-	-	2	1
8	LC-EE02(P)	LC	Analog Electronics Lab	-	-	-	60	40	100	-	-	2	1
9	LC-EE03(P)	LC	Instrumentation and Automation Lab	-	-	-	60	40	100	-	-	2	1
10	LC-EE04(P)	LC	Digital Electronics and Logic Design Lab	-	-	-	60	40	100	-	-	2	1
11	SBC-EE01(P)	SBC	Electrical Workshop	-	-	-	60	40	100	-	-	2	1
12	LLC02	LLC	Liberal Learning Course –II	-	-	-	-	100	100	-	-	2	1
13	MLC01	MLC	Professional Laws, Ethics, Gender, Human Values and Harmony	60	25	15	-	-	100	1	-	-	NC
Total				**360**	**150**	**90**	**300**	**400**	**1300**				**22**

- **Liberal Learning Course-II, LLC-02 (Any One Course from NCC/NSO/NCA)**

A. NSO

a) Any one Sports at State Level

B. NCA

(a) Music (b) Dance (c) Photography (d) Cinematography

(e) Podcasting (f) Theatre (g) Painting (h) Nutritional Education

1 Hr. Lecture	1 Hr. Tutorial	2 Hr. Practical
1 Credit	1 Credit	1 Credit

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
BSC-MA04	Numerical Methods & Transform Calculus	2:1:0	3	CIE	ESE
				40	60

Course Objectives: The objective of this course is to serve the potential engineers with techniques of numerical mathematics, Transform calculus, Fourier series and their applications. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines

Pre Requisite:- Basic knowledge of mathematics.

Module -1(06 Hours)

Fourier series: Fourier series and its types, Periodic functions and its Fourier series with spectrum analysis, Fourier series for even and odd functions, , Perceval's identity, Complex formof Fourier series.

Module -2: (06 Hours)

Fourier Transform: Definition and properties of Fourier transformation, Convolution of Fourier transformation, Fourier transformation on function spaces, solution of ordinary and partial differential equation by Fourier transformation.

Module -3: (07 Hours)

Laplace Transform: Properties of Laplace transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods, Convolution theorem, Evaluation of integrals by Laplace transforms, Solution of ODEs by Laplace transform method.

Module 4: (06 Hours)

Z transform - Definition and its properties, Convolution theorem, Z transform: impulse, unit step, ramp, sine and cosine functions etc. Region of Convergence (RoC) and properties of RoC, relation between S plane and Z plane, Inverse Z transform.

Module -5: (07 Hours)

Numerical Methods- Solution of algebraic and transcendental equations: Newton-Raphson method and Regula-Falsi method, Finite differences, Interpolation using Newton's forward and backward difference formulae, Interpolation with unequal intervals: Newton's divided differenceand Lagrange's formulae, Inverse interpolation by Lagrange's method.

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

CO1: Apply the basic concepts of Fourier series in real world engineering problems.

CO2: Interpret and apply the concepts of Fourier transform in engineering problems.

CO3: Apply the Laplace transform for the analysis of engineering problems.

CO4: Interpret and apply the concepts of Z transform in engineering problems.

CO5: Illustrate numerical methods for the solutions of algebraic and transcendental equations.

Textbooks/ References

i. Dr Sanjay Sharma "A Textbook of Signals & Systems", Kataria Publications

ii. Anand Kumar "Signals and Systems", PHI Publications.

iii. R. J. Beerends "Fourier and Laplace Transforms", Cambridge University Press,2003.

iv. Chandrika Prasad and Reena Garg "Advanced Engineering Mathematics", Khanna Publishing, 2018.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC - EE01	Electrical Circuit Analysis	2:1:0	3	CIE	ESE
				40	60

Course Objective:- Objective of this course is to introduce the students the analysis of Electric circuits using different types of theorem, the steady state and transient behavior, concept of different techniques such as Laplace transform, Fourier series/ transform and two port network.

Pre Requisite:- Should have basic knowledge of Ordinary differential equations, Matrix, Laplace and Fourier Series & transform.

Course Contents (Module 1 to 5):

Module 1: (Hrs.)

Review of circuit elements R,L,C and voltage & current sources controlled & uncontrolled sources KCL and KVL analysis, Nodal & mesh analysis, Network Theorems for AC & DC circuits- Thevenins & Norton's, Super positions, Reciprocity, Compensation, Substitution, Maximum power transfer, and Millman's theorem, Tellegen's theorem, problems with dependent & independent sources.

Module 2: (Hrs.)

Transient analysis:- Transients in RL, RC&RLC Circuits, initial conditions, time constants. Steady state analysis. Analysis of magnetically coupled circuits: Dot convention, coupling coefficient, tuned circuits, Series & parallel resonance. Network topology, concept of Network graph, Tree, Tree branch & link, Incidence matrix, cut set and tie set matrices, dual networks.

Module 3: (Hrs.)

Frequency domain analysis –Review of Laplace transform, solution of Integro-differential equations, transform of waveform synthesized with step ramp, Gate and sinusoidal functions, Initial & final value theorem, Network Theorems in transform domain.

Module 4: (Hrs.)

Concept of signal spectra, Fourier series co-efficient of a periodic waveform, symmetries as related to Fourier coefficients, Trigonometric & Exponential form of Fourier series.

Module 5: (Hrs.)

Network function & Two port networks – concept of complex frequency, Network & Transfer functions for one port & two ports, poles and zeros, Necessary condition for driving point & transfer function. Two port parameters – Z, Y, ABCD, Hybrid parameters, their inverse &image parameters, relationship between parameters, Interconnection of two ports networks, terminated two port networks.

Course Outcomes: Students will be able to:

CO1: i. understand circuit elements R,L & C and various sources.
ii. apply various network theorems (Superposition, Thevenin's & Norton's Theorem etc). for the analysis of electrical networks

CO2: i. write equilibrium equations for the transients and steady state analysis of a network.
ii. understand resonance in circuits.

CO3: apply Laplace transforms for the solution for network with periodic aperiodic excitation

CO4: apply Fourier series analysis for study of harmonics in voltage / current in a network.

CO5: compute z,y, ABCD etc., parameters of a two port network and their applications.

Textbooks/ References

1. M.E. Van Valkenburg, Network Analysis, Pearson
2. U.A. Patel, Circuit And Networks, Mahajan Publishing House.
3. J David Irwin, Robert M Nelms, Engineering Circuit Analysis, Wiley India, 2015
4. Abhijit Chakrabarty Circuit Theory, Dhanpat Rai & sons

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC - EE02	Analog Electronics	2:1:0	3	CIE	ESE
				40	60

Course Objective: The objective of this course is to familiarize the students with fundamental properties of semiconductors, diodes, transistors, amplifiers, oscillators, operational amplifiers and performing the analysis of any Analog electronics circuit. The course also provides hands on experience in setting up of simple electronic circuit.

Pre Requisite: should know basics of circuit analysis techniques, physics and mathematics.

Module 1(10 hrs.)

Semiconductor Diodes: Review of fundamentals of semiconductor P-N junction diode, Ideal versus practical diode, Resistance level , diode equivalent circuit, Switching characteristics of diode, turn ON, OFF time, reverse recovery time, Diode applications: load line analysis , series – parallel configurations, full wave and half wave rectification, voltage multiplier circuits, diode testing, Zener diode as voltage regulator, Clipper and clamper circuit.

Module 2 (10hrs.)

Transistors: Review of BJT, characteristics, and region of operation, load line, biasing methods, Switching characteristics of transistor, turn ON, OFF time, reverse recovery time, transistor as switch. FET, MOSFET- series –parallel configurations, Transistor as an amplifier, gain, bandwidth, frequency response. , Small signal analysis of transistor (low frequency) using h parameters, thermal runaway and thermal stability.

Module 3 (6 hrs.)

Feedback amplifier and Oscillators: Positive and negative feedback, Feedback amplifier-voltage-series, voltage shunt, current series and current shunt feedback, Sinusoidal oscillators, L-C (Hartley- Colpitts) oscillators, RC phase shift, Wien bridge, and Crystal oscillators. Power amplifiers, class A, class B, class A B, C amplifiers, their efficiency and power Dissipation.

Module 4 (5 hrs.)

Fundamental of Operation Amplifier: Review of differential amplifier, Operational amplifier basics- various types of ICs and packages, pin identification, temperature range and other parameters. Characteristics of ideal op-amp and practical op-amp, equivalent circuit, virtual ground.

Module 5 (10hrs.)

Operational Amplifier Application: Non-idealities in an op-amp: input offset voltage, and current, input bias current, differential input resistance, input capacitance, offset voltage adjustment range, common mode rejection ratio, supply voltage rejection ratio output voltage swing, output resistance, supply current, power consumption, transient response, slew rate, gain bandwidth product. Op-amp applications: inverting, non-inverting amplifier, summer, substractor, differentiator, integrator, differential amplifier, instrumentation amplifier, log and antilog amplifier, comparators, zero crossing detector ,Schmitt trigger and limitations, multi-vibrators, active filters, 555 timer and its application.

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

- **CO1:** Apply the knowledge of semiconductors and PN junction diodes in various applications.
- **CO2:** Illustrate design and working of BJT and FET. Analyze and discuss BJT in different types of configurations such as CC, CE, CB.
- **CO3:** Design & analyze the transistor as an amplifier and oscillator.
- **CO4:** Design and analyze different types of wave shaping circuits.
- **CO5:** Design of operational amplifiers circuits and their applications.

Text/ Reference books

1. Robert L Boylestad, Louis Nashelsky; Electronic Devices and Circuits; Pearson.
2. Jacob Millman, Cristos C Halkias, Satyabrata Jit; Electronic Devices and Circuits; McGraw- Hill.
3. S Salivahanan, N Suresh Kumar; Electronic Devices and Circuits; McGraw- Hill.
4. A. S. Sedra and K. C. Smith, “Microelectronic Circuits”, New York, Oxford University Press, 1998.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC - EE03	Instrumentation & Automation	3:0:0	3	CIE	ESE
				40	60

Course Objectives: To impart knowledge about Industrial instrumentation and automation.

Prerequisites: Basic knowledge of Physics

Course Contents (Module 1 to 5):

Module 1: (8 Hrs.)

Introduction: Static and Dynamic characteristics of instruments, dead zone, hysteresis, threshold, resolution, input & output impedance, loading effects, fundamentals of measurements, Types of Error, Statistical Analysis, Probability of Errors, Limiting Errors ,calibration of instruments, Traceability, calibration report & certification.

Module 2: (7 Hrs.)

Bridge Circuits: DC bridges: Wheatstone bridge and Kelvin bridge design, bridge sensitivity, errors in bridge circuits, null type and deflection type bridges, current sensitive and voltage sensitive bridges, applications of DC bridges AC bridges: General equations for bridge balance, Maxwell bridge, Hey bridge, Schering bridge, Wein bridge, phasor diagrams, storage and dissipation factor, applications of AC bridges.

Module 3: (8Hrs.)

Introduction to Process Control - block diagram of process control loop, definition of elements. Sensor time response - first and second order responses. Review of Transducers: Characteristics and Choice of transducer-factors influencing choice of transducer.

Module 4: (8Hrs.)

Applications of Transducers Displace measurement: Resistance potentiometer, Capacitive and Inductive. Capacitive differential pressure measurement Torsional, shearing stress and rotating shaft Torque measurement using strain gauge. Flow measurement: Hotwire anemometer,

constant resistance Constant current type Eddy current sensors, Variable reluctance tachometers Phase measurement: Analog and digital phase detectors Nano Instrumentation

Module 5: (7Hrs.)

Overview of Automation System - Architecture of Industrial Automation Systems, Different devices used in Automation Actuators, definition, types, selection. Introduction to Sequence Control, PLCs - Working, Specifications of PLC Onboard/Inline/Remote IO's, Comparison of PLC & PC, Relay Ladder Logic- PLC Programming- realization of AND, OR logic, concept of latching, Basic concepts of SCADA.

Course Outcomes: Students will be able to:

CO1: Explain different types of errors in measurement.

CO2: Knowledge of bridges for measurement of inductance, capacitance and resistance.

CO3: Explain the basic principles & importance of process control in industrial process plants.

CO4: Describe different types of transducers and its applications.

CO5: Explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction and also identify basic components of a SCADA.

Textbooks/ References

1. A. K. Sawhney, "A course in Electrical and Electronics Measurement and Instrumentation", Tenth edition, Dhanpat Rai, 1994.
2. Helfrick and Cooper, "Modern Electronic Instrumentation and Measurement Techniques" Pearson, 2007.
3. J. B. Gupta, "Electrical Measurements and Measuring Instruments", Fourth Edition, katson Publisher, 1979.Langsdorf, A.C. Machines, McGraw-Hill.
4. Curtis D Johnson," Process Control Instrumentation Technology", PHI, 1986.
5. Michael P .Lucas, 'Distributed Control system', Van Nastrant Reinhold Company, New York.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
PCC - EE04	Digital Electronics & Logic Design	3:0:0	3	CIE	ESE
				40	60

Course Objectives: Students will learn and understand the Basics of digital electronics and able to design basic logic circuits, combinational and sequential circuits.

Pre Requisite:- : Basic concepts of number system.

Course Contents (Module 1 to 5):

Module 1: (8 Hrs.)

Fundamentals of Digital Systems and Logic Families: Number Systems Decimal, Binary, Octal, Hexadecimal, 1‘s and 2‘s complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization , Don’t care conditions, and Quine-McCluskey method of minimization.

Module 2: (8 Hrs.)

Combinational Digital Circuits: Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.

Module 3: (6 Hrs.)

Sequential Circuits and Systems: Latches, SR latch with NAND & NOR gates, D latch, edge triggered flip flop, J-K flip flop, T flip flop, Master slave flip flop, Analysis of clocked sequential circuit, state table, state diagram, state reduction state equations, state assignments, flip flop excitation table & characteristic equations, Design procedure for sequential circuits, Design with state reduction, Applications of flip flop.

Module 4: (8 Hrs.)

Registers and Counters Asynchronous and Synchronous counter, counters with MOD numbers, Down counter, UP/DOWN counter, propagation delay in ripple counter, programmable counter, Pre- settable counter, BCD counter, cascading, counter applications, Decoding in counter, Decoding glitches, Ring Counter, Johnson counter, Rotate left & Rotate right counter, Registers – Buffer, Shift left, shift right, shift left/Right registers, parallel in parallel out, serial in serial out, parallel in serial out, serial in parallel out registers

Module 5: (8 Hrs.)

Semiconductor Memories and Programmable Logic Devices (PLD's) Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), FLASH memory, Programmable logic array, Programmable array logic, Field Programmable Gate Array (FPGA), introduction of HDL Programming

Course Outcomes: Students will be able to:

- **CO1:** Understand about various number systems and karnaugh map minimization method.
- **CO2:** Construct basic combinational circuits and verify their functionalities.
- **CO3:** Construct Sequential logic circuits.
- **CO4:** Analyze various types of registers and counters.
- **CO5:** Classify different types of memories.

Textbooks/ References

1. M. Morris Mano, "Digital logic and Computer design", 1st edition, Pearson Prentice Hall, 2016.
2. Anand Kumar, "Fundamentals of Digital Circuits", Prentice-Hall India, 4th edition, 2016.
3. Ronald J Tocci, Neal Widmer, Greg Moss,"Digital systems principles and applications" 11th edition, Pearson Education, 2010.
4. Donald Leech, Albert Malvino, Goutam Saha," Digital Principles and Applications", 8th edition, McGraw Hill Education, 2014.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
HSMC-HS03	Innovation And Creativity	1:0:0	1	CIE	ESE
				100	-

Course Objectives:

1. To give an insight into creativity and innovation
2. To develop an appreciation for innovation among students, and
3. To enhance sensitivity to creativity and innovation.

Pre requisite(s): Nil

Module 1: (2 Hrs.): Overview of Creativity

Meaning and concept of creativity, Process, Nature and characteristics of creativity, Factors affecting creativity.

Module 2: (1 Hrs.): Overview of Innovation

Difference between Invention & Innovation, Importance & Principles of Innovation, Process of Innovation, Domain wise Innovations, How to safe guard innovations.

Module 3: (2 Hrs.): **Tools for Innovation**

Traditional V/s Creative Thinking, Individual Creativity Techniques: Meditation, Self-Awareness, & Creative Focus Group Creative Techniques: Brain Storming, off The Wall Thinking

Module 4: (2 Hrs.): Evaluation of Effectiveness of Innovation

Legal Aspects like IPR, patent filing, copyright, Patenting Procedures, Design patents etc.

Module 5: (1 Hrs.): **Innovation Management**

Concept, Scope, Characteristics, Evolution of Innovation Management, Significance, Factors Influencing Innovation. Organizational Aspects- Economic Aspects like venture capital, angel investors.

Case Studies on Innovation business ideas i.e. RedBus, Flipcart, Ola, Big Basket, Patented products, Chemical products and Materials, special patents of procedures.

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

CO1. Analyze creativity concepts and principles & process for problem solving.
CO2. Understand innovation & apply creativity for innovation.
CO3. Understand innovative products or services.
CO4. Apply design thinking tools techniques for IPR.
CO5. Understand the concept of Innovation Management.

Text Books:

1. S. Salivahanan, S. Suresh Kumar, D. Praveen Sam, "Introduction to Design Thinking", Tata McGraw Hill, First Edition,2019.
2. Kathryn McElroy, "Prototyping for Designers: Developing the best Digital and PhysicalProducts", O'Reilly, 2017.

Reference Books:

1. Michael G. Luchs, Scott Swan, Abbie Griffin, "Design Thinking – New Product essentials fromPDMA", Wiley, 2015.
2. Vijay Kumar, "101 Design Methods: A Structured Approach for Driving Innovation in YourOrganization", 2012.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC-EE01(P)	Electrical Circuit Analysis Lab	0:0:2	1	CIE	ESE
				40	60

Course Objectives:

Objective of this course is to introduce the students the analysis of Electric circuits using different types of theorem, the steady state and transient behavior, concept of different techniques such as Laplace transform, Fourier series/ transform and two port network.

List of Experiments

1. To verify Thevenin Theorem.
2. To verify Superposition Theorem.
3. To verify Reciprocity Theorem.
4. To verify Maximum Power Transfer Theorem.
5. To verify Millman's Theorem.
6. To find Frequency Response of RLC Series Circuit.
7. To find Frequency Response of RLC parallel Circuit.
8. To determine Open Circuit parameters of a Two Port Network and to Determine Short Circuit parameters of a Two Port Network.
9. To determine A, B, C, D parameters of a Two Port Network.
10. To determine H parameters of a Two Port Network.

Course Outcomes: Students will be able to:

CO1: i. understand circuit elements R,L & C and various sources.
ii. apply various network theorems (Superposition, Thevenin's & Norton's Theorem etc). for the analysis of electrical networks

CO2: i. write equilibrium equations for the transients and steady state analysis of a network.
ii. understand resonance in circuits.

CO3: apply Laplace transforms for the solution for network with periodic aperiodic excitation

CO4: apply Fourier series analysis for study of harmonics in voltage / current in a network.

CO5: compute z,y, ABCD etc., parameters of a two port network and their applications.

Textbooks/ References

1. M.E. Van Valkenburg, Network Analysis, Pearson
2. Pankaj Swarnkar, Satya Prakashan

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC – EE02 (P)	Analog Electronics Lab	0:0:2	1	CIE	ESE
				40	60

Course Objective: The objective of this course is to familiarize the students with fundamental properties of semiconductors, diodes, transistors, amplifiers, oscillators, operational amplifiers and performing the analysis of any Analog electronics circuit. The course also provides hands on experience in setting up of simple electronic circuit.

List of Experiments

1. Design of clipper and clamper circuit using diode.
2. Study of zener diode as a voltage regulator.
3. Design of half wave and full wave rectifier circuit using diode.
4. Study BJT CE amplifier.
5. Design & measure the frequency response of an RC coupled amplifier using discrete components.
6. Design a two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth.
7. Design & realize inverting, non-inverting, buffer amplifier and wein bridge oscillator using 741 op-amps.
8. Verify the operation of a differentiator circuit using op amp IC 741 and show that it acts as a high pass filter.
9. Verify the operation of a integrator circuit using op amp 741 and show that it acts as a low pass filter.
10. Design & Verify the operation of adder and subtractor circuit using op amp 741.
11. Study of IC 555 as astable and monostable multivibrator.

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

CO1. Apply the knowledge of semiconductors and PN junction diodes in various applications.

CO2. Illustrate design and working of BJT and FET. Analyze and discuss BJT in different types of configurations such as CC, CE, CB.

CO3. Design & analyze the transistor as an amplifier and oscillator.

CO4. Design and analyze different types of wave shaping circuits.

CO5. Design of operational amplifiers circuits and their applications.

Text/ Reference books

1. Robert L Boylestad, Louis Nashelsky; Electronic Devices and Circuits; Pearson.
2. Jacob Millman, Cristos C Halkias, Satyabrata Jit; Electronic Devices and Circuits; McGraw- Hill.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC – EE03 (P)	Instrumentation & Automation Lab	0:0:2	1	CIE	ESE
				40	60

Course Objectives: To impart knowledge about Industrial instrumentation and automation

List of Experiments

1. Measurement of low resistance using Kelvin's Double Bridge..
2. Measurement of medium resistance using Wheatstone's Bridge.
3. Measurement of inductance of a coil using Anderson Bridge.
4. Measurement of capacitance of a capacitor using Schering Bridge.
5. LVDT and capacitance transducers characteristics and calibration.
6. Resistance Strain Gauge - Strain Measurement and Calibration.
7. Study of Piezo-electric Transducer and Measurement of impact using Piezo-electric Transducer.
8. Measurement of Displacement using LVDT.
9. Temperature measurement & control using thermo couple & using thermistor.
10. Study of Measurement of speed of a Motor using photoelectric transducer.
11. Study of internal architecture of programmable logic controller (PLC)
12. Introduction /Familiarization PLC trainer & its instruction with PC.

Course Outcomes: Students will be able to:

CO1: Apply the fundamentals of instrumentation in measurements and calibration of instruments.

CO2: To understand the various types of AC and DC bridges.

CO3: Explain the basic principles & importance of process control in industrial process plants.

CO4: Demonstrate transducers and its applications.

CO5: To understand the generic architecture and constituent components of a Programmable Logic Controller.

Textbooks/ References

1. K. Sawhney, "A course in Electrical and Electronics Measurement and Instrumentation", Tenth edition, Dhanpat Rai, 1994.
2. Helfrick and Cooper, "Modern Electronic Instrumentation and Measurement Techniques" Pearson, 2007

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LC – EE04 (P)	Digital Electronics & Logic Design Lab	0:0:2	1	CIE	ESE
				40	60

Course Objectives:

To develop and execute variety of assembly language programs of Intel 8086 including arithmetic and logical, sorting, searching, and string manipulation operations.

To develop and execute the assembly language programs for interfacing Intel 8086 with peripheral devices.

To develop and execute simple programs on 8051 micro controller.

List of Experiments

1. Verify the truth tables of Logic Gates.
2. Verification of Boolean laws and D Morgan's theorem.
3. Verification of MUX and DEMUX.
4. Realization of combinational circuits (Decoders/Encoders/Code Converters).
5. Design of arithmetic circuits: Half adder, Full adder, subtractor and BCD adder/ subtractor.
6. Design of Flip Flops: S-R, J-K, D type and master slave with truth tables.
7. Realization of Flip Flops using Logic Gates.
8. Realization of Flip Flops using Logic Gates.
9. Design of counters using flip flops.
10. Design of Ring counter, Johnson counter etc.

Course Outcomes: Students will be able to:

CO1. Understand about various number systems and karnaugh map minimization method.

CO2. Construct basic combinational circuits and verify their functionalities.

CO3. Construct Sequential logic circuits.

Analyze various types of registers and counters.

CO4. Classify different types of memories.

Textbooks/ References

1. Donald Leech, Albert Malvino, Goutam Saha," Digital Principles and Applications", 8th edition, McGraw Hill Education, 2014.
2. Ronald J Tocci, Neal Widmer, Greg Moss, “Digital systems principles and applications” 11th edition, Pearson Education, 2010.

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
SBC-EE01 (P)	Electrical Workshop	0:0:2	1	CIE	ESE
				40	60

Course Objective: - The objective of this course is to familiarize the students with commonly used components, accessories and measuring equipment in Electrical installations and maintenance. The course also provides hands on experience in setting up of simple wiring circuits.

Pre Requisite: - Students should aware about the fundamentals of electrical engineering.

List of Experiments

1. Identify different types of fuses & fuse carriers, MCB, MCCB with ratings and usage.
2. Understand the working and Control of two lamps in series and in parallel.
3. Demonstrate the working principle and wiring of fluorescent lamp.
4. Understand wiring of distribution board including power plug using isolator, MCB.
5. Familiarization, soldering, testing and observing the wave forms on CRO of a HW and FW uncontrolled rectifier (using diodes) with capacitor filter.
6. Measurement of voltage, current, resistance, inductance, and capacitance in a given RLC circuit using LCR meter and Multimeter.
7. Visit your college substation and familiarize the supply system, Transformer, HT Panel and Distribution etc.
8. Demonstrate construction, working and application of workshop tools. Also study the Electrical and Electronics Symbols.
9. Demonstrate the wires, cables and their gauges, Domestic Electrical Accessories.
10. Understand fault, Remedies in Domestic Installation and Indian Electricity Rules.
11. Understand the different types of earthing system and measure the earth resistance.
12. Demonstration and measurement of power consumption of electric iron, mixer grinder, single phase pump, exhaust fan, etc.
13. Minor Project on PCB.

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

CO1 Acquire knowledge about skills in basic electrical engineering practice & instruments to acquire measuring skills.

CO2 Acquire knowledge about fundamental concepts of different protection devices of electrical wiring system.

CO3 Learn the physical recognition of different electrical & Electronics components like Resistances, Inductances, Capacitances, diodes, transistors and their ratings.

CO4 Check ratings of commonly used house hold electrical appliances & expected to be able to understand the different wiring schemes used around them like in their homes, shops, college, etc.

CO5 Check ratings of commonly used house hold electrical appliances. Students are expected to be able to understand the different wiring schemes used around them like in their homes, shops, college, etc.

Text/ Reference books

1. A Course in Electrical Installation Estimating & Costing by J.B. Gupta
2. Electrical Wiring Estimating and Costing By S. L. Uppal

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Practical	
LLC 02	Liberal Learning Course - II	0:0:2	1	CIE	ESE
				100	-

- **Liberal Learning Course-II, LLC-02 (Any One Course from NCC/NSO/NCA)**

A.

NSO

a) Any one Sports at State Level

B. NCA

b) Music
c) Dance
d) Photography
e) Cinematography
f) Podcasting
g) Theatre
h) Painting
i) Nutritional Education

IPS Academy

INSTITUTE OF ENGINEERING & SCIENCE

(A UGC Autonomous Institute affiliated to RGPV)

Electrical and Electronics Engineering Department

Subject Code	Name of the Subject	L:T:P	Credits	Maximum Marks	
				Theory	
MLC 01	Professional Laws, Ethics, Gender, Human Values and Harmony	1:0:0	NC	CIE	ESE
				40	60

Course Outcomes:

Students will be able to

1. Understand the meaning of the concept - Law
2. Basic Knowledge of the laws relating to Engineers
3. Importance of being a law abiding person
4. Self Development by using different techniques to live in harmony at various levels
5. Understand their position with respect to the moral
6. Ethical character needed for a successful and satisfactory work life

Module 1: (2 Hrs.): Concept of Law: Understanding Essentials of a Valid Contract and he basics of contract law protecting rights and obligations

Module 2: (1 Hrs.) Unit II: Law and Ethics: Professional Code of Conduct for Engineers Relationship between Law and Ethics.

Module 3: (2 Hrs.): Self Awareness : Understanding oneself and others; Will be the Productive

Module 4: (2 Hrs.): Needs & Self: Needs and its importance; Understanding harmony and its relevance in actualization at personal and professional levels

Module 5: (2 Hrs.): Ethics and Values: Professional ethics and their importance for students; Understanding the importance of values & their application in everyday life

Text/ Reference books

1. Business Law- By Saroj Kumar
2. Law of Contract- By Avtar Singh
3. Business Law- By G K Kapoor
4. Business & Commercial Laws – By Sen & Mitra
5. Business Law for Engineers- by Calvin Frank Allen
6. Hilgard, E. R.; Atkinson, R. C. & Atkinson, R.L. (1975). Introduction to Psychology. 6th Edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.