Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DMA-301	**Title of the Course**	APPLIED MATHEMATICS-II(A)	**L**	**T**	**P**	**C**
Year	2	**Semester**	3	**3**	**1**	**0**	**NA**
Pre-Requisite	DMA-301	**Co-requisite**	NA				
Course Objectives	To know the basic concepts of Mathematics with their Applications in Engineering.						

Course Outcomes	
CO1	The students learn about the application of Matrices in complex Engineering problems for recording Math reports.
CO2	The students gain the skill of applying the known results of Matrix algebra for the study of structural properties of graphs and applications of graph theory such as electrical network analysis and electronic circuits in expressing a problem.
CO3	The students use matrix transforms in computer graphics. Software and hardware graphics processor uses matrices for performing operations such as scaling, translation and rotation.
CO4	The students learn to form and solve problems using differential equations of Electrical circuits, decay of radioactive elements, Motion under gravity, Newton's law of cooling and simple Harmonic motion.
CO5	To motivate students on the relevance of differential equations in various engineering disciplines for example one-dimensional transient heat conduction.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	Matrix-I	Type of matrix: Null matrix, unit matrix, square matrix, symmetric and skew-symmetric matrix, orthogonal matrix, diagonal and triangular matrix, Hermitian and Skew-Hermitian matrix, unitary matrix. Algebra of Matrix: Addition, subtraction and multiplication. Determinant of matrix, cofactor of matrix, computing inverse through determinant and cofactor. Elementary row/column transformation: meaning and use in computing inverse of matrix.	10	1
2.	Matrix-II	Linear dependence/independence of vectors. Definition and computation of rank of matrix through determinants, elementary row and column transformation (Echelon and Normal form of matrix), consistency of equations.	8	2
3.	Eigen Values and Eigen Vectors, Cayley Hamiltom Theorem	Definition and evaluation of Eigen values and Eigen vectors of a matrix of order 2 and 3. Cayley Hamilton theorem (without proof) and its verification, use of Cayley-Hamilton theorem in finding inverse.	6	3
4.	Ordinary Differential Equation	Introduction, formation, order, degree of ordinary differential equation. Formation of ordinary differential equations through physical, geometrical, mechanical, electrical consideration. Solution of differential equations of first order and first degree by variable separable, reducible to variable separable forms, linear and Bernoulli form and exact differential equation.	8	4
5.	Second Order Differential Equation Simple Application	Properties of solution, linear differential equation of second order with constant coefficients, complimentary function and particular integral, equation reducible to linear form with constant coefficients. LCR circuit, Motion under gravity, Newton's law of cooling, Radioactive decay, Population growth, Oscillations of a string, Equivalence of electrical mechanical system.	8	5

References Books:

1. Applied Mathematics: Kailash Sinha, Meerut publication
2. Applied Mathematics: P.K Gupta, Asian Publication
3. Applied Mathematics: H.R Luthra, Bharat Bharti Prakashan.
4. Applied Mathematics: H.K Das, C.B.S Publication.
5. Mathematics for Polytechnic: S.P Deshpande, Pune Vidyarthi Griha.

e-Learning Source:

https://youtu.be/rBNQ0r7CN2c?si=dWel4wkajbAzEvrt

https://youtu.be/syLIPtxjN0E?si=Gn9S_AjtmUriMP45

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	3	-	-	-	-	-	1	-	-	-
CO2	-	3	-	-	1	-	-	-	-	2	-
CO3	-	3	-	-	1	-	1	-	1	-	-
CO4	-	3	-	-	1	-	-	-	-	-	1
CO5		3	-	-	-	-	-	-	-	2	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Integral University, Lucknow

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2017-18							
Course Code	DCS-301	**Title of the Course**	Programming in C & C++	**L**	**T**	**P**	**C**
Year	2ND	**Semester**	3rd	**3**	**1**	**0**	
Pre-Requisite		**Co-requisite**					
Course Objectives	1.To make students familiar with program language and its related terminologies 2.Study of different types of programming module along with their functionality 3.To Understand the basic Concept of Programming Language						

Course Outcomes	
CO1	Obtain knowledge of programming concepts and languages especially C language.
CO2	Illustrate the basic information of C programming likes Data Types, variables, input output functions, control statements etc.
CO3	Apply programming concepts and techniques to build the basic programs of C languages as well as develop the practical approach on programming.
CO4	Illustrate the other advance programming concepts like Array, Pointer, Union, Structure and Functions
CO5	Illustrate the programming constructs and features of object oriented language, limitation of procedural language and structures of C++ program.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
1	Introduction	Introduction to programming, concept of programming, programming languages, concept of flow chart, Algorithms, introduction to C language, history of C, procedural language	8	CO1
2	C Foundations	Basics of C: keywords, constant, variables, data types, operators and expressions, input output functions (printf and scanf), header files, control statement: if else, while, do while, for, switch.	8	CO2
3	Structure of C	Introduction to arrays (one dimensional, two dimensional), introduction to strings, functions-function declaration, definition, function calling , Introduction to structures union, pointer.	8	CO3
4	Programming in C	Programs in C Addition, subtraction, multiplication and division of numbers, Calculation of areas-Square, circle, rectangle, Calculation of simple and compound interest. Even odd using if else, factorial of number using while do-while, fibonacci series using for loop.	8	CO4
5	Object Oriented Programming	Object Oriented Programming- limitation of procedural language, object oriented approach, introduction to OOPS, characteristics of object oriented language, Objects, Classes, Inheritance, Polymorphism, structure of C++ programs.	8	CO5

References Books:

1- C in Depth: S.K. Srivastava, Deepali Srivastava, BPB Publication

2- Programming in ANSI C: E. Balaguruswamy, TMH Publication

e-Learning Source:

1- https://www.geeksforgeeks.org/difference-between-c-and-c/

2- https://www.w3schools.com/cpp/cpp_intro.asp

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	2	1	-	-	-	-	-	-	-	-
CO2	-	2	-	1	1	-	-	-	1	-	-
CO3	-	2	-	3	-	-	-	-	1	1	-
CO4	-	2	2	-	-	-	-	-	1	-	-
CO5	-	2	-	3	-	-	-	-	-	-	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-301	**Title of the Course**	Principal of Digital Electronics	**L**	**T**	**P**	**C**
Year	2nd	**Semester**	3rd	**3**	**1**	**0**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	1. To acquire the basic knowledge of digital logic levels. 2. Application of knowledge to understand digital electronics circuits. 3. To prepare students to perform the analysis and design of various digital electronic circuits. 4. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics						

Course Outcomes

CO1	Convert different type of codes and number systems which are used in digital communication and computer systems.
CO2	Employ the codes and number systems converting circuits and compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency
CO3	Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.
CO4	Assess the nomenclature and technology in the area of memory devices and apply the memory devices in different types of digital circuits for real world application.
CO5	To develop skills to build and troubleshoot counter circuits and programmable logic devices.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Introduction to digital electronics	Basic difference between analog and digital signal. Number system: Binary number system, Decimal number system, octal number system, Hexadecimal number system. Conversion of bases: conversion from Decimal, Octal & Hexadecimal to Binary and vice-versa. Binary addition, subtraction, multiplication and division including binary points. Binary Codes: BCD, 8421 code, Gray code, Binary to Gray code conversion and Gray to Binary code conversion. Complements: Signed numbers, Signed magnitude representation, 1's and 2's complement representation. Addition and subtraction of numbers in 2's complement representation.	8	1
2	Logic gates	Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, Exclusive OR, Exclusive NOR gates. Logic simplification: Boolean algebra, Boolean theorems, karnaugh-mapping upto 4 variables, Implementation of logic equations with gates.	8	2
3	Combinational Logic Circuits	Introduction to combinational and sequential logic circuits. Arithmetic circuits: half adder, full adder, half subtractor, full subtractor. Multiplexer: 2:1, 4:1. Demultiplexer: 1:2, 1:4. Decoder: 3 to 8 Decoder, Encoder.	8	3
4	Flip Flops	Introduction, Latches and flip flop, SR, T, D, JK and master slave JK flip flop. Counter: Introduction, counter classification, 2-bit, 3-bit ripple counter, MOD-5 counter.	8	4
5	Shift Registers:	Introduction, serial in serial out, shift left, serial in parallel out, parallel in serial out, and parallel in parallel out shift registers. Memory and Programmable logic: volatile and non-volatile, RAM, ROM, PLA, PAL.	8	5

References Books:

1. Digital Principles & Application: Malvino & Leach, Mcgraw Hill-5th Edition.
2. Digital logic & Computer Design: Mano, M. Morris, PHI publication.
3. Digital Electronics: D.A. Godse and A.P. Godse: Technical Publication.
4. Digital Electronics Circuits & System: Puri, V: TMH

e-Learning Source:

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3				3							1		2	3	2
CO2		2		2							1						2
CO3		2		2								1					2
CO4	1	2		3													2
CO5		2							2		1						2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-302	**Title of the Course**	Network Filter & Transmission Line-I	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	Analyze and design electrical circuits, apply network theorems, resonance, passive filters, and understand transmission line applications.						

Course Outcomes	
CO1	Apply mesh and nodal analysis on simple circuits and reduce the complex circuits using network theorems.
CO2	Draw and analyze phasor diagrams for different ac circuits using vector diagram.
CO3	Describe the concept of symmetrical, asymmetrical, balanced, unbalanced, T, PI, ladder and L networks with calculation of two port network parameters.
CO4	Determine the characteristic impedance experimentally and plot the attenuation characteristic of prototype low pass, high pass and band pass filter.
CO5	Measure characteristic impedance of the transmission line.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Circuit Elements & Energy Sources**	Circuit elements & energy sources: Resistance, Inductance, Capacitance, Series & Parallel combination of Resistance, Inductance, Capacitance. Voltage and current Sources, Analysis of Network by KVL, KCL Network Theorems: Theivenins, Norton's, Super Position, Maximum Power transfer theorem.	8	1
2	**Sinusoidal Response Resonance**	Sinusoidal Response of series and parallel RL, RC, RLC circuits. Resonance: Properties of resonance of RLC circuit, Q factor of series and parallel resonating circuit, selectivity and bandwidth.	8	2
3	**Two Port Networks**	Network elements, Z-parameters, Y-parameters, Hybrid parameters, ABCD parameters.	8	3
4	**Passive Filters**	Passive Filters: Introduction, Ideal Filter, Practical Filter, properties and use of Filters, Active and passive Filters, Analysis of prototype LPF, HPF, BPF and Band stop Filter. LPF Filter with RC and RL circuit, HPF Filter with RC and RL circuit.	8	4
5	**Transmission Line & their Applications**	Transmission line and their application: shapes of different type of transmission lines including 300Ω Antenna feeder cable, 75Ω co-axial cable, and Optical fiber cable.	8	5

References Books:

1. Circuit Theory: A. Chakrabarti, Dhanpat Rai & Co. publication.
2. Power System: J.B. Gupta, S.K. Kataria & Sons publication.
3. Network Filters & Transmission Line: J.P. Ryder, PHI publication.
4. Network Analysis & Synthesis: A.K. Chakraborty, TMH.

e-Learning Source:

1. Network Analysis by NPTEL
2. Transmission Line Model

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1		2		2							1					
CO2	2	2											3			
CO3		1		3							1					
CO4		1		2	3										2	
CO5		2		2	2											

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-303	**Title of the Course**	Electrical Machines	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	Analyze the operation and applications of three-phase systems, transformers, DC machines, synchronous machines, and induction motors.						

Course Outcomes	
CO1	Basic concept of three phase circuit and power measurement.
CO2	Knowledge about the constructional details, working and principles of transformers.
CO3	Introduction to electrical machines and their applications.
CO4	Learn the construction and principle of operation of different kinds of DC machines.
CO5	Learn the construction and principle of operation of different kinds of AC machines.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Three Phase Supply**	Elementary idea about 3-phase supply, Star and delta connection, Relationship between phase and line voltage and currents, Power and power factor in three phase system and their measurement, Comparison between three phase and single-phase supply.	8	1
2	**Transformers**	Principle of operation, E.M.F equation, Voltage & Current relations, Construction and applications of small transformers used in Electronics and Communication Engineering, construction of auto transformers, constant voltage transformer, Phasor diagram of a transformer on load; Definition of voltage regulation and efficiency; Elementary idea of losses in transformer, open circuit and short circuit test, Parallel operation of Transformer.	8	2
3	**D. C. Machines**	(a) D. C. Generator: Working principle, constructional details, e.m.f equation, types of generators and their applications. (b) D. C. Motor: Working principle, back e.m.f., types of D. C. motor and elementary idea of their characteristics, torque equation, methods of speed control (Description only).	8	3
4	**Synchronous Machines**	(a) Alternators: Working principle, types of alternators, constructional details. e.m.f. equation, condition for parallel operation. (b) Synchronous Motors: Working principle, construction details, vector diagram, effect of excitation on armature current and power factor.	8	4
5	**Induction Motors**	Three Phase Induction Motor: Working principle and constructional details, types of induction motor, slip ring and squirrel cage, slip in induction motor, speed torque characteristics, starting and speed control, application of induction motor in industry.	8	5

References Books:

1. Power Electronics: P.S. Bhimra, Khanna publication.
2. Electric Machines: D.P. Kothari, I.J. Nagrath, TMH Publications.
3. Electric Machines: Ashfaq Hussain, Dhanpat Rai Publication.

e-Learning Source:

1. Basic Electrical Circuits by NPTEL
2. Electric Machines by OpenCourseWare

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1		1		2				1	2		1	2				
CO2		1		2				1	2		1	2	3			
CO3		1		2				1	2		1	2				
CO4		1		2				1	2		1	2			2	
CO5		1		2				1	2		1	2				

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2013-14							
Course Code	DEC-304	**Title of the Course**	Electronics Devices & Circuits - I	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	Design and analyze transistor amplifiers, feedback amplifiers, tuned amplifiers, and oscillators for various applications.						

Course Outcomes	
CO1	Evaluate frequency response curve for different multi stage amplifier
CO2	Perform comparison between different class of power amplifiers.
CO3	Evaluate the impact of feedback on single stage transistor amplifier.
CO4	Understand the selection and rejection of signals using tuned voltage amplifier.
CO5	Define different transmission line & calculation of their parameters.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Multistage Transistor Amplifiers**	Need of multistage amplifier, different coupling schemes and their working, Application of each of the type of coupling in brief, Working of R.C. coupled and transformer coupled multistage amplifier, approximate calculation of voltage gain for a two stage RC coupled amplifier, Frequency response of R-C coupled and transformer coupled amplifiers and its physical explanation, definition and physical significance of the term as bandwidth, upper and lower cross over frequencies etc., Direct coupled amplifier and its limitations, differential amplifier typical circuits diagram and its working.	8	1
2	**Transistor Audio Power Amplifiers**	Difference between voltage and power amplifier, importance of impedance matching in power amplifier, collector efficiency of power amplifier, Typical single ended power amplifier and its working, graphical method for calculation of output power, heat dissipation curve and importance of heat sinks, class A, class B, class C amplifier (without derivation). Working principle of push pull amplifier and circuits, its advantages over single ended power amplifier, cross over distortion in class B operation and its reduction, different driver stages for push pull amplifier circuit, Working principle of complementary symmetry push pull circuit and its advantages, Transformer less audio power amplifiers and their typical application.	8	2
3	**Feed Back Amplifiers**	Basic principle and types of feedback, Derivation of expression for the gain of an amplifier employing feedback, Effect of negative feedback on gain, stability, distortion and band width (Only physical explanation) Typical feedback circuits: (a) A.C. coupled amplifiers with emitter by-pass, capacitor removed. (b) Emitter follower and its application, simple mathematical analysis for voltage gain and input impedance of above circuits.	8	3
4	**Tuned Voltage Amplifiers**	Classification of amplifiers on the basis of frequency, Review of basis characteristics of tunned circuits, (Series and Parallel), Single and Double tuned amplifier, their working principles and frequency response (no mathematical derivation).	8	4
5	**Sinusoidal Oscillators And Wave Shaping Circuits**	Sinusoidal Oscillators: Application of oscillators, Use of positive feedback/negative resistance for generation of oscillation, barkhawn's criterion for oscillations, Different oscillators circuits, tuned collector, Hartley, colpitts, phase shift, Wien's bridge and crystal oscillator and their working principles (no mathematical derivation). Wave Shaping Circuits: General idea about different wave shapes, Review of transient phenomena in R-C and R-L circuits, R-C and R-L differentiating circuits and integrating circuits and their applications.	8	5

References Books:

1. Basic Electronics & Linear Circuits: Bhargava, Kulshreshtha & Gupta, Tata Mcgraw-Hill..
2. Micro Electronics Circuits: Sedra, Adel S. Smith, Kenneth. C., Oxford University Press 5th Edtion
3. Neamen D A, “Electronics Circuits”, 3rd Ed TMH

Integral University, Lucknow

4. Jacob Millman and Arvin Grabel, “Microelectronics”, 2nd Ed TMH
e-Learning Source:
1. Analog Electronics Circuits by NPTEL
2. Electronics Circuits

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	3				1											
CO2	3												3			
CO3	3															
CO4					2										2	
CO5		2					1									

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-351	**Title of the Course**	**Principal of Digital Electronics Lab**	**L**	**T**	**P**	**C**
Year	2nd	**Semester**	3rd	**0**	**0**	**3**	
Pre-Requisite	None	**Co-requisite**	None				
Course Objectives	1. Students will learn and understand the Basics of digital electronics and able to design basic logic circuits, combinational and sequential circuits. 2. Learn and understand the basics of Boolean algebra, and test/verify the functionality of the logic circuits.						

Course Outcomes

CO1	Identify the various digital ICs and understand their operation.
CO2	Designing from simple to complex logic circuits.
CO3	Construct basic combinational circuits and verify their functionalities
CO4	Describe the operation and timing constraints for latches and registers

Experiment No.	Title of the Experiment	Content of the Unit	Contact Hrs.	Mapped CO
1	IC Identification	Identification of IC no's, Pin no's and IC types.	3	1
2	Gate IC verification	Verification of truth table for 2 Input NOT, AND, OR, NAND, NOR, XOR gates.	3	1
3	Basic gates using NAND	Realization of NOT, OR, AND, NOR, EX-OR and EX-NOR gates using NAND gate.	3	1
4	Basic gates using NOR	Realization of NOT, OR, AND, NOR, EX-OR and EX-NOR gates using NOR gate.	3	1
5	Design using Logic gates	Design and Implementation of Simple Logic Circuits.	3	2
6	Design Combinational circuit	To construct half adder and half subtractor using XOR and NAND gates verification of their truth tables	3	3
7	Design Combinational circuit	Implementation of full adder and full subtractor using logic gates.	3	3
8	Design Combinational circuit	Implementation of 4x1 multiplexer using logic gates.	3	3
9	Simplification of large circuits	To construct a full adder circuit with XOR and NAND gates.	3	3
10	Four Adder Circuit	To verify the truth table of 4 bit adder IC chip 7483	3	4

References Books:

1. The 8051 Microcontroller and Embedded Systems: Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, "Pearson Prentice Hall"
2. Microprocessor & Application: B. Ram, TMH Publication.
3. Microprocessor and Interference: D V Hall, TMH Publication.

e-Learning Source:

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

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	Sign & Seal of HoD

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-352	**Title of the Course**	Network Filter & Transmission Line – I Lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**0**	**0**	**2**	
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	To introduce the fundamentals of circuits, network theorems, phasor diagrams, resonance, two-port networks, passive filters, and transmission lines.						

Course Outcomes	
CO1	Solve network problems using mesh, current and node voltage equations.
CO2	Analyze complex networks using Thevenin, Norton, Maximum power transfer, Superposition theorem.
CO3	Obtain characteristics of various transmission lines.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment-1	Experimental verifications of the Thevenin's and Norton's theorem with an a.c. source.	2	1
2	Experiment-2	Experimental verifications maximum power transfer theorem.	2	2
3	Experiment-3	To plot the impedance characteristic of a prototype band pass filter.	2	1
4	Experiment-4	To design Ist order and IInd order active LPF filter using IC 741 and draw the frequency response curve.	2	1
5	Experiment-5	Measurement of characteristics of a short transmission line.	2	1
6	Experiment-6	Measurement of L & C of lossless transmission line.	2	2
7	Experiment-7	To measure the characteristics impedance of a symmetrical T/π network.	2	2
8	Experiment-8	Measurement of Attenuation of lossless transmission line.	2	3
9	Experiment-9	For a prototype high pass filter: (a) Determine the characteristics impedance experimentally, (b) To plot the attenuation characteristic.	2	3
10	Experiment-10	For a prototype low pass filter: (a) Determine the characteristics impedance experimentally, (b) Plot the attenuation characteristics.	2	3

References Books:

e-Learning Source:

1. www.vlab.co.in

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-		-	-	
CO3	2	3	-	-	-	-	-	-	-	-	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session:							
Course Code	DEC-353	**Title of the Course**	Electronics Workshop Lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**0**	**0**	**2**	
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	Identify components, assemble PCBs, and design working circuits for mini projects.						

Course Outcomes	
CO1	Identify and test of various component used on PCB.
CO2	Practice on PCB machine and their operations
CO3	Design and fabricate small circuit using technical knowledge.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Experiment-1	Identification of various electronic components and devices.	2	1
2	Experiment-2	Study and testing of different types of Resistors, Capacitor, Inductor, Diode, Transistor (BJT, FET, MOS, CMOS) and ICs (All Popular Families).	2	2
3	Experiment-3	Study of different processes by performing in assembling Soldering, Desoldering, Cutting, Stripping and connecting.	2	1
4	Experiment-4	Familiarisation with tools, equipment, materials and processes of a single and double-sided PCB making using direct etching method.	2	1
5	Experiment-5	Dark Room Practice. (a) Exposure using UV light/daylight (b) Developing (including dye developing) (c) Fixing (d) Printing (including contact printing) (e) Enlarging/Reducing	2	1
6	Experiment-6	Exercises in drilling, assembling and testing of single and double-sided PCB; proper storage of PCBs.	2	2
7	Experiment-7	Mini Project: Design and assemble at least two working circuits in Full Fabricated Form from given options. a) Single Stage Amplifier, b) Halfwave and Full wave Rectifier, c) Filters d) Power Amplifier (Push Pull), e) Clap Switch, f) Burglar Alarm g) Water level Indicator, h) Single band transistor radio receiver	2	2

References Books:

e-Learning Source:

1. www.vlab.co.in

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-		-	-	
CO3	2	3	-	-	-	-	-	-	-	-	

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**