Integral University, Lucknow

Effective from Session: 2011-12							
Course Code	DMA-401	**Title of the Course**	APPLIED MATHEMATICS-II(B)	**L**	**T**	**P**	**C**
Year	2	**Semester**	4	**3**	**1**	**0**	**-**
Pre-Requisite	DMA-401	**Co-requisite**	NA				
Course Objectives	To know the basic concepts of Mathematics with their Applications in Engineering.						

Course Outcomes	
CO1	Jacobians are used in designing and forging a robot.
CO2	Vector calculus or vector analysis is used in the description of electromagnetic fields.
CO3	A simple Laplace transform is conducted while sending signals over any two-way communication medium (FM/AM stereo-2-way radio sets, cellular phones.)
CO4	Fourier series is used in signal processing.
CO5	Probability models are useful anywhere that you cannot model a situation deterministically.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1.	Differential Calculus-II	Function of two variables, identification of surfaces in space, partial derivatives, chain rule, higher order partial derivatives, Euler's theorem (without proof) for homogeneous functions, Jacobians.	8	01
2.	Vectors Calculus	Scalar and Vector function. Derivative, Gradient, Divergence & Curl of functions. Directional derivatives. Line, Surface & Volume integrals	8	02
3.	Laplace Transformation	Definition & properties of Laplace & Inverse Laplace transformation. Unit step function, periodic function. Solution of ordinary differential equations by Laplace transformation.	8	03
4.	Beta and Gamma Functions Fourier Series	Definition of Beta and Gamma functions, relation between Beta and Gamma functions, their use in evaluating integrals. Fourier series of odd and even functions.	8	04
5.	Probability and Statistics Method of Least-Square and Curve Fitting:	Definition of probability, laws and conditional distribution, discrete and continuous distribution. Binomial, Normal and Poisson distribution. Straight line, parabola	8	05

References Books:

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

e-Learning Source:

https://www.youtube.com/watch?v=syLIPtxjN0E&list=PLn78sdsv0QoXBxWmyGp5SQdg-F_AlyB05&pp=iAQB

https://www.youtube.com/watch?v=rBNQ0r7CN2c&list=PLn78sdsv0QoXUdre4aCAobj3cxACkNeLL&pp=iAQB

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	2	2	-	-	-	-	-	-	1	1
CO2	2	3	2	1	-	-	-	2	-	-	-
CO3	2	3	1	-	-	-	-	-	1	-	-
CO4	3	3	2	1	-	-	-	1	-	-	-
CO5	2	3	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: 2024-25							
Course Code	DEC-401	**Title of the Course**	Principle of Communication Engineering	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**3**	**1**	**0**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After undergoing the subject, the students will be able to Understand communication & their significance, understand and describe type of communication, compare different types of communication.						

Course Outcomes	
CO1	Perform various modulation and demodulation techniques on analog signals for radio communication.
CO2	Compare the performance of AM, FM and PM schemes.
CO3	Co-Evaluate the performance of PCM, DPCM and DM.
CO4	Perform characteristics evaluation of AM Trans-receiver system
CO5	Analyze concept of various modulation schemes for digital communication

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Amplitude Modulation	Introduction of communication system, Need of modulation and demodulation in communication system, Types of modulation. Amplitude Modulation: Introduction, SSB and VSB modulation and demodulation schemes, AM transmitters and receivers, super heterodyne receiver, frequency division and time division multiplexing	8	1
2	Angle Modulation	Angle Modulation: Frequency modulation, phase modulation, FM receiver and demodulators. Noise: Signal to Noise ratio, Noise calculation, Internal and external noise, Noise in AM and FM system. Radio Wave Propagation: Electromagnetic waves, properties of Radio waves, propagation of wave	8	2
3	Pulse Modulation	Pulse Communication: Sampling process, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation and Pulse Code Modulation, Delta modulation.	8	3
4	Radio Receiver	Radio Receivers: Types of Receivers, characteristics of Radio Receiver, AM receiver, communication receiver, FM receiver, Basic FM demodulators.	8	4
5	Digital Modulation	Digital Modulation: Brief description of phase shift keying, Differential phase shift keying (DPSK), Frequency shift keying. Demodulation of AM wave using diode detector circuit, Demodulation of FM wave.	8	5

References Books:

1 Kennedy & Davis- Electronic Communication System, Tata Mcgraw Hill.

2 Simon Haykin- Communication System- John Wiley & Sons.

3 B.P. Lathi, “Modern Digital and Analog communication Systems”, 3rd Edition, Oxford University Press.

4 H. Taube, D L Schilling, Goutom Saha, “Principles of Communication”, 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

e-Learning Source:

1. http://swayam.gov.in
2. http://spoken-tutorial.orgs

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

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2024-25

Integral University, Lucknow

Course Code	DEC-402	Title of the Course	Electronics Devices & Circuits-II	L	T	P	C
Year	II	Semester	IV	3	1	0	
Pre-Requisite		Co-requisite					
Course Objectives	After undergoing the subject, the students will be able to Understand OP-AMP & their significance, understand and describe type of Integrated Circuit, compare different types of IC.						

Course Outcomes

CO1	Realize various multivibrator circuits using BJT
CO2	Evaluate the technical parameters of inverter and their effect on transistor switching time
CO3	Realize different linear and non-linear application of Op-amp
CO4	understand various process used in the manufacturing of IC

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	MULTIVIBRATOR	MULTIVIBRATOR CIRCUITS: Ideal transistor switch; explanation using C.E. output characteristics, calculation of component values (collector and base resistors) for a practical transistor switch, Transistor switching time. Basic concept of working of collector coupled bistable, monostable and stable multivibrator circuits including principle of triggering, Operation of Schmitt trigger, calculation of upper trigger potential (UTP) and lower trigger potential (LTP). Transistorized voltage-controlled oscillator (basic principle only).	8	1
2	OP-AMP	OPERATIONAL AMPLIFIERS: Specifications of ideal operational amplifier and its block diagram, Definition of inverting and noninverting inputs, differential voltage gain and input and output off set, voltage input offset current, input bias current, common mode rejection ratio (CMMR), power supply rejection ratio (PSRR) and slew rate, use of op.amp. as an adder, subtractor, differential amplifier, buffer amplifier, differentiator, integrator, comparator, Schmitt Trigger, Generation of Square and Triangular Waveform, log and anti-log amplifiers, PLL and its application	8	2
3	555 Timer	Timer IC: Block diagram of IC timer (such as NE 555) and its working, use of 555 timer as monostable and astable multivibrator, and waveform generator. Regulated Power Supply, Concept of regulation, Basic regulator circuits (using Zener diode), OP-AMP regulators, IC regulators, Fixed Voltage regulators, (78/79, XX) 723 IC regulators (Current Limiting, Current Fold Back), SMPS.	8	3
4	Integrated Circuit	Introduction to Microelectronics: Advantages of integration, Types of integrated circuits, Monolithic and Hybrid circuits, Different stages of fabrication of ICs- Epitaxial Growth, Oxidation and film deposition, Diffusion and Ion Implantation, Lithography & Etching. (Only brief idea of all)	8	4
5	Very Large-Scale Integration	Masking, Selective doping, Fine-line lithography and isolation for Monolithic circuits, Introduction to monolithic device elements such as BJT, MOS, transistor and integration of other circuit elements, Very large scale integration (V.L.S.I.).	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 Edition

3 Neamen D A, "Electronics Circuits", 3rd Ed TMH

4 Jacob Millman and Arvin Grabel, "Microelectronics", 2nd Ed TMH

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	3	3	-	-	-	-	-	-	-	-	1
CO2	2	2	2	-	-	-	-	-	-	2	-
CO3	2	3	2	-	-	-	-	-	-	-	-
CO4	-	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: 2024-25							
Course Code	DEC-403	**Title of the Course**	INDUSTRIAL ELECTRONICS & TRANSDUCER	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**3**	**1**	**0**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After undergoing the subject, the students will be able to Understand transducer & their significance, understand and describe type of thyristor, and their application.						

Course Outcomes	
CO1	Study of different types of transducers and its applications.
CO2	Study of different types of sensors and its applications.
CO3	Familiar with power electronics device.
CO4	Construction and characteristic of different power electronic devices and its application.
CO5	Study of working and output waveform of power electronics converter.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Transducers	Transducers: Basic idea and principle of operation and their use in measuring physical parameters. Sensing elements and transducers for measurement of motion, force, pressure, flow, temperature, light, vacuum etc.	8	1
2	THYRISTORS	THYRISTORS AND THEIR APPLICATIONS: symbol and typical applications of members of thyristor family. SCR, Triac and Diac-Basic structure, operation, V-I characteristics and ratings, gate circuits, triggering process, selections of heat sinks, mounting of thyristor on heat sinks, basic idea of protection of thyristor circuits.	8	2
3	SCR	Operation, V-I characteristics, equivalent circuit of an UJT. Single phase rectifier: various types of phase-controlled rectifiers using SCR for resistive and inductive load explanation using wave shapes and appropriate mathematical equation (No derivation).	8	3
4	Three phase rectifiers	Three phase rectifiers: Half wave, full wave (including bridge) poly phase rectifiers using SCRs; explanation using wave shapes and formula (no derivation). Operation of three Phase Bridge controlled rectifier and its applications.	8	4
5	cycloconverter	Principle of operation of basic inverter circuits, principle of operation of cycloconverter, choppers and dual converter, mention their applications.	8	5

References Books:

1 Kennedy & Davis- Electronic Communication System, Tata Mcgraw Hill.

2 Simon Haykin- Communication System- John Wiley & Sons.

3 B.P. Lathi, “Modern Digital and Analog communication Systems”, 3rd Edition, Oxford University Press.

4 H. Taube, D L Schilling, Goutom Saha, “Principles of Communication”, 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	1	2	-	-	-	-	-				
CO2	1	-	-	-	2	1	-				
CO3	1	-	-	1	2	2	2				
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: 2013-14							
Course Code	DEC-404	**Title of the Course**	Antenna & Wave Propagation	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**3**	**1**	**0**	**-**
Pre-Requisite	-	**Co-requisite**	-				
Course Objectives	To introduce the concepts of electromagnetic waves, antenna fundamentals, types and properties of antennas, antenna arrays, wave propagation, and MODEMs.						

Course Outcomes	
CO1	Explain the basic concepts related to electromagnetic waves and its associated terminology.
CO2	To attain knowledge on the basic parameters those are considered in antenna design and their analysis on the basis of different frequency ranges.
CO3	To acquire knowledge on antenna operation and types with their application in real time field.
CO4	Plot and explain the radiation pattern for various antenna as well as for their arrays.
CO5	Demonstrate various modes of propagation of waves i.e. Ground Wave, Sky Wave and Space Wave.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	**Review of Electromagnetic waves**	Introduction, general wave equation, waveguide. Physical concept of radiation of electromagnetic energy from an antenna, relationship between the direction of electric and magnetic fields with direction of propagation; concept of polarization of EM waves. Electromagnetic spectrum and its various range VLF, LF, HF, VHF, UHF, Microwave, Optical waves etc.	8	1
2	**Antenna fundamentals**	Definition and physical concepts of the terms used with antennas like point source, gain, power gain, directivity aperture, effective area, radiation pattern, (field strength, power and phase) beam angle, beam width and radiation resistance. Antenna input impedance, Antenna temperature.	8	2
3	**Types of antennas**	Brief description, characteristics and typical applications of medium wave antenna, shortwave antenna, HF antenna, VHF, UHF and Microwave antenna e.g., half wave dipole, ground plane, Yagi and ferrit rod antenna in transistor receiver. Brief idea about Rhombic antenna, dish antenna, Horn, Parabolic reflector and Lens antenna.	8	3
4	**Antenna Arrays and Communication Media**	Antenna Arrays: Introduction, Antenna Array, Array Design, types of arrays, Brief description of broad side and end fire arrays, their radiation pattern and application (without analysis) Communication Media: Telephone Lines, Twisted Pair Wire, Co-axial Cable, Fiber optics.	8	4
5	**Wave propagation and Modems**	Wave propagation: Basic idea about different modes of radio wave propagation ground wave propagation, space wave propagation and sky wave propagation, their characteristics and typical areas of application. (e.g. medium wave, short wave, TV communication.) Explanation of the terms-critical frequency, maximum usable frequency (MUF) and skip distance. Modems: Basic working principle of modems and their application	8	5

References Books:

1. Antenna & wave propagation: K.D. Prasad, Satya Prakashan.
2. Communication System: Simon Haykin, John Wiley & Sons.

e-Learning Source:

1. Advance Antenna Theory by NPTEL
2. Electromagnetic Fields and Energy by OpenCourseWare

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1		2			1	2	1									1
CO2			3	2	1	2	1				1					1
CO3	1	2		3											2	
CO4	1		2								1				3	
CO5		2				2					1					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: 2024-25							
Course Code	DEC-405	**Title of the Course**	Network Filter & Transmission Line-II	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**3**	**1**	**0**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After undergoing the subject, the students will be able to Understand real power, apparent power & their significance, understand active filters and their significance.						

Course Outcomes	
CO1	Knowledge of power relation in AC circuit.
CO2	Basic concept of three phase circuit and power measurement.
CO3	Analysis of symmetrical components and its operators.
CO4	Introduction of different types of active filters.
CO5	Concept of reflection and standing wave of transmission line and its equation.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Power relation in AC circuit	Power relation in AC circuit: Power factor, Apparent Power, Reactive Power, Power triangle, Complex Power.	8	1
2	Analysis of three phase circuit	Analysis of three phase circuit: Introduction, Advantage of three phase system, Relationship between line and phase voltage and currents in star connection and delta connection. Measurement of power and power factor of a balanced three phase load.	8	2
3	Symmetrical components analysis	Symmetrical components analysis: Introduction, Operator 'A', Properties of Operator 'A', symmetrical components, Star-Delta Transformer, three phase power in terms of symmetrical components.	8	3
4	Active Filters	Active Filters: Introduction, Theory of active filter, Realization of active filter, Low pass filter, Butter worth filter, Chebyshev filter, Cauer filter.	8	4
5	Transmission Line	Concept of reflection and standing wave on a Transmission Line, Definition of reflection coefficient in terms of characteristics impedance and load impedance, standing wave ratio. Transmission line equation: Expression for voltage, current and impedance at a point on the lines for lines with and without losses.	8	5

References Books:

1 Kennedy & Davis- Electronic Communication System, Tata Mcgraw Hill.

2 Simon Haykin- Communication System- John Wiley & Sons.

3 B.P. Lathi, "Modern Digital and Analog communication Systems", 3rd Edition, Oxford University Press.

4 H. Taube, D L Schilling, Goutom Saha, "Principles of Communication", 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

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

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

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

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	DEC-451	**Title of the Course**	Principle of Communication Engineering Lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**0**	**0**	**3**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After undergoing the subject, the students will be able to Understand communication & their significance, understand and describe type of communication, compare different types of communication.						

Course Outcomes	
CO1	Observe the performance of AM and FM signals.
CO2	Perform signal sampling on baseband signal and reconstruct the signals
CO3	Generate ASK, PSK and FSK schemes and observe their waveform.
CO4	
CO5	

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Amplitude Modulation	To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation.	3	1
2	Amplitude Modulation	To obtain an AM wave from a collector modulator circuit and observe the Am pattern on CRO.	3	1
3	Amplitude Modulation	To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion=2	3	1
4	Amplitude Modulation	To obtain AM-SB from Balanced modulator.	3	1
5	Amplitude Modulation	To detect AM-SB by using SSB detector.	3	2
6	Radio Receiver	To identifying different stages of radio receiver and IC used at each stage and plot the sensitivity characteristics of a radio receiver and determination of the frequency for maximum sensitivity	3	2
7	Radio Receiver	To plot the selectivity characteristics of a radio receiver.	3	2
8	Radio Receiver	Tuning and alignment of radio receiver.	3	2
9	Radio Receiver	Circuit tracing and fault finding of different stages of radio receiver	3	2
10	Digital Modulation	Simple demonstration of ASK, FSK and PSK through training kits	3	3

References Books:

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	2	-	-	1				
CO2	-	1	-	2	-	-	1				
CO3	-	1	-	2	-	-	1				
CO4	-	1	-	2	-	-	1				
CO5	-	1	-	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: 2024-25							
Course Code	DEC-452	**Title of the Course**	Electronics Devices and Circuits Lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**0**	**0**	**3**	
Pre-Requisite		**Co-requisite**					
Course Objectives	After undergoing the subject, the students will be able to Understand communication & their significance, understand and describe type of communication, compare different types of communication.						

Course Outcomes	
CO1	Observe and plot the waveshapes at various points of electronic component to understand their behavior.
CO2	Construct and test feedback circuits and analyse their results.
CO3	Test and observe voltage regulation with and without IC regulator in a circuit.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Amplifier	To measure the overall gain of two stage R.C. coupled amplifier at 1 Khz and note the effect of loading of second stage on the first stage	3	1
2	Amplifier	To observe the effect of a by-pass capacitor by measuring voltage gain and plotting of frequency response for a single stage amplifier	3	1
3	Amplifier	To measure input and output impedance of a feedback amplifier with and without by-pass capacitor.	3	1
4	Amplifier	Measurement of voltage gain input and output impedance and plotting of frequency response of an emitter follower circuit.	3	1
5	Amplifier	To measure the frequency response of a single stage tuned voltage amplifier and calculation of the Q of the tuned circuit load.	3	2
6	Schmitt Trigger	To test a transistor schmitt trigger circuit, observe and plot the waveshapes at various points.	3	2
7	OP AMP	Use of Op-Amp. (For IC-741) as Inverting and non-inverting amplifier, adder, comparator, buffer, scale changer.	3	2
8	555 Timer	Simple working circuits using NE555.	3	2
9	IC Regulator	To test adjustable IC regulator and current regulator.	3	2
10	Integrated Circuit	Identification, Pin configuration and basic working of different popular IC's - Ex.- Power amplifier, Oscillator, Tuned amplifier, Multivibrator, Timer.	3	3

References Books:

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

PO-PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4
CO											
CO1	2	-	-	-	-	-	-				
CO2	-	3	2	-	-	-	-				
CO3	-	3	-	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: 2024-25							
Course Code	DEC-453	Title of the Course	INDUSTRIAL ELECTRONICS AND TRANSDUCERS LAB	L	T	P	C
Year	II	Semester	IV	0	0	3	
Pre-Requisite		Co-requisite					
Course Objectives	After undergoing the subject, the students will be able to Understand communication & their significance, understand and describe type of communication, compare different types of communication.						

Course Outcomes	
CO1	Able to draw the characteristics and calculation of different parameters of SCR and UJT.
CO2	Able to draw the wave shapes of single phase and three phase rectifier circuits.
CO3	Able to understand function of LVDT and thermocouple.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
1	Thyristor	To determine and plot firing characteristics of SCR (a) By varying the anode to cathode voltage. (b) By varying the gate current	3	1
2	Thyristor	Observing voltage wave shapes at various points of UJT relaxation oscillator circuit.	3	1
3	Thyristor	Observation of wave shapes at relevant points of the circuit of a single-phase controlled rectifier using SCR and UJT relaxation oscillator.	3	1
4	Thyristor	Observe the wave shapes and measure a.c. and d.c voltage at various points of a three-phase bridge rectifier circuit.	3	1
5	Thyristor	Observe the wave shapes and measure a.c. and d.c. voltage at various points of a three phase SCR controlled bridge rectifier circuit.	3	1
6	Thyristor	Test an a.c. phase control circuit using triac and observe Wave shapes and voltages at relevant points in circuit (while using for lamp intensity control and or a.c. fan speed control).	3	1
7	Inverter	To study the working of a single-phase SCR/ transistor inverter circuit by observing wave shapes at input and output.	3	2
8	Transducer	To measure motion, force, pressure by using LVDT.	3	2
9	Transducer	To measure Temperature by using thermocouple, light by using photo diode.	3	2
10	Transducer	Calibration of D.C Ammeter and Voltmeter using potentiometer and also draw graph showing percentage error for different observed values of current and voltmeter.	3	3

References Books:

e-Learning Source:

http://swayam.gov.in

http://spoken-tutorial.orgs

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

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

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