Integral University, Lucknow

Effective from Session: 2024-25							
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**

Integral University, Lucknow

Effective from Session:2011-12							
CourseCode	DEE-301	**Title of the Course**	Electrical Design Drawing & Estimating-I	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third	**3**	**1**		-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Fundamental of identification and sketching of symbols of electrical equipments and accessories 2. Study the layout of wiring installation of house and industry						

Course Outcomes	
CO1	Identification and sketching of symbols of electrical equipments and accessories which is needed in single and multiple line drawing of wiring systems.
CO2	Effective and suitable cost analysis for domestic and power wiring installation for normal and specific conditions.
CO3	Analyze, compare and controlling light and power circuit accessories of different types of wiring system from different locations according to particular need and condition.
CO4	Learn to Calculate the load and decide the ratings of electrical equipment and accessories and also decide the number of light and power circuit will be required for Domestic wiring circuit according to IS specification.
CO5	Design the layout of wiring installation of house and industry and calculation of length of wiring materials before actual wiring to reduce cost of labour charge and wastage.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
Unit-I	Electrical Symbols and Diagrams	Need of symbols; List of symbols for electrical equipments and accessories used in electrical light, fan and power circuits, alarm and indicating circuit , contactor control circuits as per I.S.S. Type of diagrams - Wiring diagrams (multiple and single line representation) and schematic diagrams as per I.S.S. • One Drawing Sheet for atleast - 50 symbols.	8	1
Unit-II	Wiring materials and accessories	Brief description, general specifications (as per I.S.S.) and approximate cost of different types of wires, cables, switches, distribution board, switch board, boxes, batten and its accessories, conduit and its accessories, lamp holders, socket out lets, plug ceiling roses. fuse amd energy meter used in domestic and power wiring installations. Brief description, general specifications and approximate cost of switches,push buttons, bells, indicating lights, indicating panels, relays etc.used in alarm circuits. * Study of materials and accessaries in work shop.	8	2
Unit-III	Light and Fan Circuits	for the following types of circuits:-Light and fan controlled by necessary switches and regulators.Stair case wiring • Corridor lighting One lamp controlled by three or more switches. One drawing sheet for atleast 4- problems. • Wiring practice for atleast 3-circuits.	8	3
Unit-IV	Estimation of Domestic Internal Wiring Circuits	(Small Houses) (i) Description of various wiring systems and methods. (ii) Need of earthing and point to be earthed in internal wiring system as per IE rules. (iii) I.S. specifications, calculation of No. of points (light, fan, socket outlet), calculation of total load including domestic power, determination of no. of circuits, size of wires and cables, switches and main switch, distribution board and switch board, batten conduit and other wiring accessories.	8	4
Unit-V	Layout of installation plan, single line wiring diagram	Calculation of length of batten/conduit of differant sizes and wire length; schedule of materials. Estimating for small houses using PWD/CPWD electrical schedule rates (E.S.R.) • The drawing sheet for atleast 4-layouts and circuits • Estimation practice for atleast - 2 installations each for small houses.	8	5

ReferencesBooks:

1. Electrical Engg. Drawing Design & Estimating - K.B.Raina & S.K. Bhattacharya –Willey Eastern Publication
2. Electrical Engg. Drawing Desing & Estimating – Jaggi & Pal & Lal – Nav Bharat Prakashan, Meerut

e-LearningSource:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1		2	2	3	2	-	1	3	-	2			2	
CO2		2	2	-	2	-	2	-	-	2			2	
CO3	-	2	2	2	-	-	-	2	2	-			3	
CO4	-	-	-	3	3	-	2	2	2	2			2	
CO5	2	-	2	3	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:2011-12							
CourseCode	DEE-302	**Title of the Course**	Electrical Instrument &Measurements-I	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third	**3**	**1**	-	-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Fundamental of measurement and instruments 2. Study the Construction and working principle of measuring instruments.						

Course Outcomes	
CO1	Introduction to different parameters that defines the quality of instruments.
CO2	Construction, working and application of PMMC and MI instruments.
CO3	Power measurement in three phase circuit.
CO4	Construction and working of CT and PT.
CO5	-

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
Unit-I	Introduction to electrical measuring instruments	Concept of measurement and instruments. Electrical quantities and instruments for their measurements	8	1
Unit-II	Measurement and Errors	Accuracy, precision, types of errors, probability of errors and Gaussian Errors curve, sensitivity, resolution and stability. Classification of errors. Types of electrical measuring instruments, indicating, integrating and recording instruments. Essentials of indicating instruments , deflecting, controlling and damping torques. Measurement of dielectric strength of insulating oil and dielectric loss.	8	2
Unit-III	Ammeters and voltmeters	Ammeters and voltmeters (moving coil and moving iron type) Concept of ammeters and voltmeters and difference between them. Construction and working principle of moving coil and moving iron instruments.	8	3
Unit-IV	Merits and demerits	Sources of errors and application of these instruments. Extension of range, use of C.T. & P.T. simple problems theorem for d.c. circuits.	8	4
Unit-V	Wattmeters	Wattmeters (Dynamometer type) and Maximum Demand Indicator: Construction, working principle, merits and demerits of dynamometer type wattmeter. Sources of errors. Power measurement in three phase circuit by Two wattmeter and three wattmeter methods, simple problems. Construction and working principle of maximum demand indicators	8	5

References Books:

1. A course in Electrical & Electronics Measurement & Instrumentation – A.K. Shahney Dhanpat Rai & Sons Publication
2. Electrical Measurements and Measuring Instruments- R.K. Rajput

-LearningSource:

https://nptel.ac.in/

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

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

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

Effective from Session: 2011							
Course Code	DEE-303	**Title of the Course**	ELEMENTARY MECH. & CIVIL ENGG.	**L**	**T**	**P**	**C**
Year	II	**Semester**	III	**3**	**1**	**0**	**-**
Pre-Requisite	DEE-303	**Co-requisite**	NA				
Course Objectives	The objective of the Elementary Mech and Civil Engineering course is to introduce students to fundamental concepts in mechanics and basic principles of civil engineering, laying the groundwork for understanding the behavior of materials and structures.						

Course Outcomes	
CO1	Students will be able to solve problems regarding mechanics such as beams, trusses, shear force and bending moment diagrams etc.
CO2	Students will be able to find the mechanical efficiency of simple machines.
CO3	Students will understand functions of boiler, gas turbine external and internal combustion engines etc.
CO4	Students will understand the working of turbines and pumps, flow of water through and hydrostatic forces.
CO5	Students will understand the basics of building materials such as cement, brick and concrete.
CO6	Students will understand the basics of surveying and building foundations.

UnitNo.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
UNIT - I	**Applied Mechanics**	General condition of equilibrium of a rigid body under coplanar forces. Concept of tie, strut, beam and trusses. Shear force and bending moment diagram of simply supported beam and cantilever for point load. Concept of center of gravity, moment of inertia and friction. Mechanical advantage, velocity ratio, mechanical efficiency of simple machines: Lifting machines much as pulley, differential pulley, wheel and axle, simple screw jack, worm and worm wheel.	8	CO-02
UNIT - II	**Strength of Materials & Power Transmission:**	Stress, strain, elastic constraints, stress in circular shaft subjected to pure torsion only. Rivetted and bolted joints. Power transmission by solid and hollow shaft. Gear trains - simple and compound, fly wheel. Rope and belts - velocity ratio, length, size of belt and power transmitted. Hydraulics & Hydraulic Machines:	8	CO-01
UNIT - III	**Fluids**	Properties of fluids, pressure of fluid and its measurement. Flow of fluids velocity and discharge, Bernoulli's theorem and its application in venturimeter, flow through pipe, head loss due to friction. water turbines- Pelton and Reaction, reciprocating and centrifugal pump.	8	CO-4
UNIT -IV	**Heat Engines and Civil Engineering Materials**	Heat Engines: External & internal combustion engines, working of diesel and petrol engines, horsepower of IC engines, steam generator, construction and working of Bobcock & Wilcox boiler, Cochran boiler, condenser, steam turbine classification and principle of operation, gas turbine. Civil Engineering Materials: General idea of raw materials, manufacturing process, properties and uses of Bricks, lime, cement and Timber.	8	CO-5
UNIT -V	**Foundation & Surveying**	Foundation (i) Bearing capacity of soil and its importance, need of foundation for electrical machines. (ii)Foundations for heavy, light and vibrating machines. (iii)Concrete proportion, mixing w/c ratio, workability RCC and its use. Surveying (i)Basics of chaining and leveling (ii)Description of Instruments used	8	CO-5

References Books:

1. **Basic Mechanical Engineering – R.S. Khurmi**

e-Learning Source:

1. **https://youtu.be/RVgxWTluoYk?si=W_H4oKH3aBbjDuDF**

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	-	-	3	-	-	-	2	2	-	-	3	-	-	-			2	-	-	
CO2	-	l	2	1	1	-	2	1	-	-	-	-	-	-			2	1	-	
CO3	-	1	-	-	-	-	3	2	1	-	1	-	-	-			3	2	1	
CO4	2	3	-	1	1	2	-	2	1	-	-	-	3	-			-	2	1	
CO5	2	3	-	-	1	2	-	1	2	-	-	-	3	-			-	1	2	
	-	-	1	-	2	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:2011-12							
CourseCode	DEE-306	**Title of the Course**	POWER SYSTEM	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third	**3**	**1**	-	-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Fundamental of electrical power system 2. Study the Layout of substation, substation equipment and their functions						

Course Outcomes	
CO1	Study of basic structure of power system network.
CO2	Different types of conductors and power cables for transmission and distribution
CO3	Mechanical design characteristic of transmission line.
CO4	Different performance parameters of overhead lines.
CO5	Layout of substations equipments.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
Unit-I	SUPPLY SYSTEM	Layout of electrical power system from generating station to consumer end, Component of electrical power system from generating station to consumer end. Advantages of high voltage transmission. Requirement of interconnection, Advantages of interconnection. Concept of grid interconnection.	8	1
Unit-II	CONDUCTORS AND POWER CABLES	Types of conductors. Comparison of conductor cost in various systems. Comparison of overhead/under ground systems. Power cable construction. Oil filled, gas filled and SF6 gas cables. Testing of cables.	8	2
Unit-III	MECHANICAL CHARACTERISTIS	Types of insulators. Voltage distribution and string efficiency. Improvement of voltage distribution. Line support. Parabolic method of sag calculation at level support. Ice and wind loading of conductors. Factors affecting sag.	8	3
Unit-IV	PERFORMANCES OF LINES	Line parameters. Expression for line inductances and line capacitances. Performances of short and medium lines. Normal tee and л-method of calculation of voltage regulation and efficiency. Elementary idea of long transmission line.	8	4
Unit-V	SUBSTATIONS	Layout of substation, substation equipment and their functions, gas insulated substation (GIS) Reactors: Types of reactors, current limiting reactors, uses of reactors	8	5

References Books:

1. Electrical power system by "Ashfaq Hussain"
2. Electrical power system by "Nagrath and Kothari

-LearningSource:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	2	-	-	-	-	-	-	-	-			2	
CO2	-	-	1	-	-	-	-	-	-	-			2	
CO3	-	-	-	3	-	-	-	-	-	-			3	
CO4	-	-	-	-	-	-	3	-	-	-			2	
CO5	-	-	-	-	-	-	-	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:2015-16							
CourseCode	DEE-307	**Title of the Course**	Circuit Theory	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third	**3**	**1**	-	-
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Fundamental of three phase balanced circuits 2. Study the Various two port circuit parameter						

Course Outcomes	
CO1	Characteristics of ideal and practical energy sources and reducing the complexity of circuit by source transformation.
CO2	Obtaining the values of voltage, current and power in series and parallel RLC circuit.
CO3	Obtaining different two port network parameters in a given circuit and their interrelationship.
CO4	Calculation of three phase power in poly phase circuits.
CO5	Resonance condition in series and parallel RLC circuits and calculation of different parameters.

Unit No.	**Title of the Unit**		**Contact Hrs.**	**Mapped CO**
Unit-I	CIRCUIT ANALYSIS AND DC TRANSIENTS	Ideal and practical voltage and current sources. Source transformation: Voltage Sources to Current Source and vice versa. Mesh and nodal analysis of DC circuits with voltage sources, current sources and combination of these two. Growth of current in an inductive circuit, time constant of R-L circuit , decay of current in an inductive circuit. Charging of a capacitor, time constant of RC circuit, initial and final values. Discharge of a capacitor	8	1
Unit-II	TWO PORT NETWORK	Various two port circuit parameter: their interrelationship, evaluation of Z,Y,h and transmission (ABCD) parameters, cascading of two port network.	8	2
Unit-III	AC CIRCUITS	Definition and explanation of alternating current, voltage and their relative terms, phasor diagrams of alternating current and voltage in series and parallel A.C. circuit containing purely resistive, capacitive, inductive elements (a combination of two elements and a combination of all three elements). Mesh analysis for A.C. circuits, nodal analysis for A.C. circuits, choice between mesh and node analysis.	8	3
Unit-IV	THREE PHASE CIRCUITS	Generation of three phase voltages, phase sequence, star and delta connection, line and phase values, phasor diagrams, power in a three phase balanced and solution of three phase balanced circuits	8	4
Unit-V	RESONANCE	Series resonance: definition, derivation of expression for resonant frequency, quality factor, voltage and current, resonance curve, lower and upper half power frequency, bandwidth and selectivity, dependence of band width and selectivity on quality factor (problems based on the above). Parallel resonance circuit (same as for series resonance)	8	5

References Books:

1. Network and systems: Ashfaq Husain
2. Electrical technology: B.L.Theraja

-LearningSource:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	2	
CO2	-	3	-	-	-	2	-	-	-	-	1	2	2	
CO3	-	3	-	-	-	-	-	-	-	-	-	-	3	
CO4	-	3	-	-	-	-	-	-	-	-	1	-	2	
CO5	-	3	-	-	-	-	-	-	-	-	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: 2011-12							
Course Code	DEE-351	**Title of the Course**	ELECTRICAL WIRING & FABRICATION SHOP	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third			**2**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study MCB/ELCB (Earth Leakage Circuit Braker). 2. Study Batten wiring containing light, ceiling fan, socket points						

Course Outcomes	
CO1	Installation of different wiring schemes on board.
CO2	On hand practice and testing of different wiring installation, MCB and ELCB in the wiring workshop.
CO3	Conceptualize about the safety measure have to be taken during actual practice of electrical installations**.**

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	To prepare a folder/display board of accessories used in domestic wiring with complete specifications.	2	1
Experiment-2	To prepare a display board of tools used in wiring and fabrication shop.	2	2
Experiment-3	Batten wiring containing light, ceiling fan, socket points	2	2
Experiment-4	Staircase wiring using two way switches.	2	2
Experiment-5	Connection of a fluorescent tube using starter, choke and single way switch and its fault detection	2	2
Experiment-6	Practice of domestic conduit wiring.	2	2
Experiment-7	Testing of wiring installation by meggar**.**	2	2
Experiment-8	Connection of mercury lamp along with accessories.	2	3
Experiment-9	Making of an extension board containing two 5 A and 15 Amp plug points controlled byindividual switches using MCB/ELCB (Earth Leakage Circuit Braker).	2	3

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	2	3	3	3	1	2	1	2	2	-	-	-	-
CO2	2	2	3	-	2	-	2	2	-	-	-	-	-	-
CO3	1	2	2	3	-	-	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: 2011-12							
Course Code	DEE-352	**Title of the Course**	ELECTRICAL INSTRUMENTS AND MEASUREMENT LAB	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third			**2**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study Extension of ranges. 2. Study ac bridges.						

Course Outcomes	
CO1	Conversion and extension of ranges of voltmeter and ammeter.
CO2	Identification of different types of bridges.
CO3	Measurement of power in single phase and three phase system.
CO4	Application of CRO for the measurement of different electrical quantities.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	To extend the range of an ammeter	2	1
Experiment-2	To extend the range of an Voltmeter	2	2
Experiment-3	To convert an ammeter into voltmeter.	2	2
Experiment-4	To calibrate 1-phase energy meter by direct loading method.	2	2
Experiment-5	To make proper connections of indicating/integrating instruments in a circuit e.g. wattmeter, frequency meter, power factor meter, 1-phase and 3-phase energy meter (Analog type/Digital Type) etc.	2	2
Experiment-6	To measure power, power factor in a l-phase circuit using wattmeter and power factor meter and verify results with calculations.	2	2
Experiment-7	Measurement of power and power factor of a 3-phase balanced load by 2-wattmeter method.	2	2
Experiment-8	Measurement of voltage, frequency of a sinusoidal signal with C.R.O.	2	3
Experiment-9	Measurement of resistance, voltage, current with electronic multimeters (Analog & Digital) and compare the reading.	2	3
Experiment-10	To measure strain by transducer.	2	3
Experiment-11	To measure inductance by maxwell's bridge.	2	3
Experiment-12	To measure capacitance by Wein's/Schering bridge.	2	3
Experiment-13	To calibrate three phase energy meter with the help of standard 3 phase energy meter.	2	3
Experiment-14	To connect a Trivector meter in a three phase circuit and make measurement of different quantities.	2	3

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	2	-	-	-	-	-	2	3	-	-	-	-
CO2	-	-	2	-	-	-	-	-	2	3	-	-	-	-
CO3	-	-	2	-	-	-	-	-	2	3	-	-	-	-
CO4	-	-	2	-	-	-	-	-	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: 2011-12							
Course Code	DEE-353	**Title of the Course**	ELEMENTRY MECH. ENGINEERING LAB	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Third			**2**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study alignement and coupling of a motor generator set. 2. Study Bernoulli's theorem with the help of Bernoulli's appratus.						

Course Outcomes	
CO1	Understand the basic concept of Bernoulli theorem
CO2	Student should be aware with properties of materials.
CO3	Student should be able learn M.A and V.R of different lifting machine.
CO4	Understand the working of different hydraulics machine.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	To operate a diesel engine (starting, running and shutting down) and to study lubricating and cooling system of the engine.	2	1
Experiment-2	To determine BHP of diesel or petrol engine and show that BHP is directly proportional to revolution per minute of engine shaft.	2	2
Experiment-3	To determine mechanical advantage, velocity ratio, efficiency and effort loss due to friction in screw jack.	2	2
Experiment-4	To verify Bernoulli's theorem with the help of Bernoulli's appratus.	2	2
Experiment-5	To determine head loss due to friction in GI pipes.	2	2
Experiment-6	To operate the Pelton wheel and Francis Turbine and to understand its construction and working.	2	2
Experiment-7	To perform tensile test on mild steel and aluminium wire specimen and compare the result.	2	2
Experiment-8	To do alignement and coupling of a motor generator set.	2	3

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

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

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