Integral University, Lucknow

Effective from Session: 2024-25							
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: 2015-16							
Course Code	DEE-401	**Title of the Course**	ELECTRONICS-II	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Operation on different logic gates. 2. Identification of different ICs.						

Course Outcomes	
CO1	Different number systems and their conversions..
CO2	Operation on different logic gates and familiarization of different logic families.
CO3	Develop design capability of combinational circuit and sequential circuit.
CO4	Operation of op-amp and its application..
CO5	Identification of different ICs and its pin diagram configuration..

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Digital Electronics	Introduction, Basic difference between analog and digital signal; Advantages of digital system and its field of applications. Number system: Binary, Decimal, Octal and Hexadecimal and their need.	8	1
Unit-II	Logic Gates, Logic Families	Symbol and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates. Boolean theorems and postulates (without proof), Realization of small Boolean functions and reduction using Karnaugh's map. TTL, MOS, CMOS, ECL, DTL, HTL.	8	2
Unit-III	Flip Flops	Half Adder, Full Adder, Half subtractor and Full subtractor circuits and their operations, Display devices. Encoder, Decoder, Multiplexer and Demultiplexer. Introduction, S-R flip flop, D flip flop, J-K flip flop and T flip flop	8	3
Unit-IV	Operational Amplifiers	Specification of ideal operational amplifier and its block diagram as an inverter, adder, subtractor, differential amplifier, buffer amplifier, differentiator, integrator, log and antilog amplifiers. Introduction to IC: Types of IC's, some example of popular IC's (74 & 40 series) i.e. 7400, 7402, 7404, 7408, 7432, 7486, 74266	8	4
Unit-V	Registers and Counters	Shift registers, SISO, SIPO, PISO, PIPO, Universal Shift register, ripple counter, synchronous counter, Ring counter, Johnson counter, other counters. Memory and programmable logic: RAM, ROM, PLA, PAL.	8	5

References Books:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education.
2. Hill & Peterson, "Switching Circuit & Logic Design", Wiley.
3. V.K. Mehta, "Principle of Electronics"
4. S. Salivahanan and S. Arivazhagan, "Digital Electronics", Vikas publication.

e-Learning Source:

https://nptel.ac.in/

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	-	-	-	-	-	2	-	-	-	3	-
CO2	-	1	-	-	-	-	-	-	2	-	-	-	3	-
CO3	-	1	-	-	-	-	-	-	2	-	-	-	3	-
CO4	-	1	-	-	-	-	-	-	2	-	-	-	3	-
CO5	-	1	-	-	-	-	-	-	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-402	**Title of the Course**	ELECTRICAL INSTRUMENTS AND MEASUREMENTS-II	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study different types of measuring instruments. 2. Study of process instrumentation system.						

Course Outcomes	
CO1	Study of different types of energy meters for domestic and commercial purpose.
CO2	Working and applications of miscellaneous measuring instruments like megger,power factor meter, frequency meters etc.
CO3	Basic idea and application of electronic instruments like CRO, multi-meters andVTVM.
CO4	Measurement of electrical quantities using different bridges.
CO5	Study process instrumentation system and various sensors/transducers.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Energymeter (Induction type)	Construction, working principle, merits and demerits of single-phase and three phase energy meters. Testing of energy meters for calibration. Errors and compensation. Simple problems. Digital Energy meter (Single Phase/Three Phase) Construction working and application Trivector Meter, Construction, Working & Its Application	8	1
Unit-II	Miscellaneous Measuring Instruments	The construction, working principle and application of: ohm-meter, meggar, earth tester, multimeter, frequency meter (reed-type) single phase power factor meter (Electrodynamometer type), 3-phase power factor meter, phase sequence indicator, synchronoscope. Trivector meter-Construction, Working and application.	8	2
Unit-III	Electronic Instruments	Cathode Ray Oscilloscope, construction, working of various controls of CRO. Simple applications (like measurement of voltage current and frequency). Introduction to electronic multimeter, analog multimeter, digital multimeters and V.T.V.M.	8	3
Unit-IV	Measurement Bridges	Measurement of Resistance Inductance and Capacitance Bridges : Maxwell bridge, Wein's bridge and Schering bridge. Potentiometer, Kelvin's double bridge.	8	4
Unit-V	Process Instrumentation	Elements of Process Instrumentation Block diagram of process instrumentation system and purpose of each block. Basic principles of various sensors/transducers for measurement of temperature, pressure, strain and liquid level.	8	5

References Books:

1. "A Course in Electrical & Electronics Measurement & Instrumentation – A.K. Shahney Dhanpat Rai & Sons Publication

e-Learning Source:

https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	1	-	-	-	-	-	-	-	1	-	-	2	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-	2	-
CO3	-	-	-	-	-	2	-	-	-	-	-	-	2	-
CO4	-	2	-	-	-	-	-	-	-	1	-	-	2	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	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-403	**Title of the Course**	ELECTRICAL MACHINE–I	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Working of different types of electrical machines. 2. Analysis of characteristic of different electric machine.						

Course Outcomes	
CO1	Features of different types of rotating electrical DC machines.
CO2	Characterization of DC machine according to their characteristics and application.
CO3	Speed control of DC motor and their applications.
CO4	Working of transformer and its performance.
CO5	Interconnection of alternator and its synchronization.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	Generalised Treatment of Electrical Machines	1.1 Definitions of motor and generator. 1.2 Torque due to alignment of two magnetic fields and concept of torque angle 1.3 Elementry concept of generator and motor 1.4 Classification of main types of electrical machines and their generalised treatments in respect of their working (only d.c. machine to be dealtwith). 1.5 Common features of rotating electrical machines..	8	1
Unit-II	D.C. Machines	2.1 Construction of d.c. machines. 2.2 E.M.F. equation 2.3 Electromagnetic torque (torque equation) 2.4 Principle of generating and motoring action. 2.5 Speed and torque equation 2.6 Armature reaction and commutation in d.c. m/cs. 2.7 Factors controling speed of d.c. motor. 2.8 Speed control methods and starters for d.c. m/cs. 2.9 Characterstics and application of D.C. generators and motors.	8	2
Unit-III	Transformer	3.1 Classification, construction, principle and working of 1 ph. and 3 ph. transformer. 3.2 E.M.F. equation. 3.3 Phasor diagram on noload and load. 3.4 Transformer connections. 3.5 Losses and efficiency. 3.6 Voltage drops and regulation. 3.7 Connections for parallel operation. 3.8 Cooling 3.9 Testing of transformer as per IS specification (Type test and routine test, etc.)	8	3
Unit-IV	Special transformer	Current transformer, potential transformer uses of C.T. and P.T., auto transformer, rectifier transformer, dry type transformer, furnace transformer earthing transformer, traction transformer and its use. Welding transformer: constructional detail, comparison between power and welding tansformer, metal rectifier..	8	4
Unit-V	A. C. Generator (Alternator)	Working principle, construction, Full pitch and short pitch winding, pitch factor or coil span factor, distribution or winding factor, E.M.F. equation, rating of alternators, armature reaction, voltage drops in allternator, vector diagram of loded alternator, voltage regulation and its determination, Efficiency of alternator, conditions for parallel operation, Methods of parallel operation, operation of alternators when connected to infinite bus bar. Voltage regulator like tirril and brown bovery type.	8	5

References Books:

1. "Electrical Machine – Ashfaq Husain

e-Learning Source:

https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	2	2	2	-	-	2	3	-	2				3
CO2	-	2	2	2	-	-	2	3	-	2				3
CO3	-	2	3	2	-	-	2	3	-	1				3
CO4	-	2	2	2	-	-	2	3	-	2				3
CO5	-	2	1	-	1	-	2	3	-	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-406	**Title of the Course**	TRANSMISSION AND DISTRIBUTION OF ELECTRICAL POWER	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study the various types of transmission and distribution system. 2. To study power factor improvement and its importance.						

Course Outcomes	
CO1	To study about general structure and various methods of power transmission and distribution system.
CO2	Design of electrical and mechanical aspects of transmission and distribution system.
CO3	Concept of power line carrier communication and its applications.
CO4	Power factor improvement and its importance.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	ELECTRICAL DESIGN OF LINES	Layout of different transmission and distribution systems, Advantages of high voltage transmission, Constructional features of transmission lines, Types of supports, Concept of short, medium and long lines. COMPENSATION TECHNIQUES Series compensation and Shunt compensation on a transmission line.	8	1
Unit-II	DISTRIBUTION SYSTEM	Feeder, Distributors and Service mains, Radial and Ring main distributors, AC distributors fed from one end and both ends. Simple problems on size of feeders and distributors, Kelvin's law, Limitations of Kelvin's law, Modification in Kelvin's law.	8	2
Unit-III	CARRIER COMMUNICATION	Principle of carrier communication over power lines, Purposes and Equipments, Difference between radio transmission and carrier communication, Block diagram, Voltage control.	8	3
Unit-IV	CORONA AND HVDC TRANSMISSION	Phenomenon of corona, Factors effecting corona, Disruptive critical and Visual critical voltages, Corona power loss, Minimizing corona. Components of a HVDC transmission system, Applications of HVDC systems, Limitations of AC transmission, Economic comparison, Advantages and Limitations of HVDC transmission.	8	4
Unit-V	POWER FACTOR IMPROVEMENT	Effects of low power factor, Causes of low power factor, Necessity of power factor improvement, Methods for improvement of power factor, Advantages of improved power factor by installing capacitors at consumer end.	8	4

References Books:

1. Ashfaq Hussain, "Electrical Power System"
2. C.L.Wadhwa, "Generation Distribution and Utilization of Electrical Energy" Wiley Eastern Publication.
3. J.B.Gupta, "A Course in Power System", S.K.Kataria & Sons.

e-Learning Source:

https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	-	2	-	1	-	3	-	-	-	-	-	-	-
CO2	-	-	-	2	3	-	3	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	2	-	1	-	1	-	-	-
CO4	-	-	-	-	-	-	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: 2011-12							
Course Code	DEE-407	**Title of the Course**	POWER PLANT ENGINEERING	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth	**3**	**1**	**-**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Study the different types of power plants.. 2. Concept of selection of power plant depending upon availability of resources.						

Course Outcomes	
CO1	Conventional power plants, their operation and accessories used in operation.
CO2	Nuclear power plant as a base load power plant and diesel power plant as peak load plant, operation and working of different accessories.
CO3	Considering environmental issues, introduction of non-conventional and renewable energy sources like solar, biomass, wind, tidal etc.
CO4	Selection of power plant depending upon availability of resources.

Unit No.	Title of the Unit		Contact Hrs.	Mapped CO
Unit-I	THERMAL POWER PLANT	Introduction, Advantages and Disadvantages, Working of thermal power plant with various auxiliaries (Boiler, super-heater, steam turbine, condenser, economizer, air-pre-heater, feed water heater etc.), Fuel Handling, Fuel Combustion and Combustion Equipment, Problem of Ash Disposal, Heat Balance and Efficiency, Cooling Tower and Ponds, Introduction to Base Load and Peak Load Plants.	8	1
Unit-II	HYDRO-ELECTRIC POWER PLANT	Introduction, Advantages and Disadvantages, Hydrology, Hydrograph, Flow Duration Curve (simple numerical problems), Working of different types of Hydro-Electric Plants and their field of use, Introduction to auxiliaries (Dams, Surge Tank, Penstock, Spill Way, Tail Race etc.), Types of Turbines (Kaplan, Francis, Pelton), Turbine Governors, Pumped Storage Plants.	8	2
Unit-III	NUCLEAR POWER PLANT	Introduction, Advantages and Disadvantages, Elements of Nuclear Power Plant and Plant Layout, Nuclear Reactor and its Components (Nuclear fuels, Moderator, Coolant, Control Rods, Reflector etc.), Classification of Nuclear Reactor (Boiling Water Reactor, Pressurized Water Reactor, Fast Breeder Reactor)	8	2
Unit-IV	DIESEL POWER PLANT	Introduction, Advantages and Disadvantages, Working of Diesel Power Plant, Diesel Plant Equipments, Diesel Plant Layout, Performance and Fuel Requirements of Diesel Engine Plant, Log Sheet. GAS-TURBINE POWER PLANT Introduction, Advantages and Disadvantages, Principle of Operation of Gas Turbine Power Plant, Open Cycle and Closed Cycle Gas Turbine Power Plant.	8	4
Unit-V	NON-CONVENTIONAL SOURCES OF ENERGY	Introduction, Advantages and Disadvantages, Concept of Solar Energy, Biomass Energy, Wind Energy, Tidal Energy, Geothermal Energy, Microhydel Energy	8	4

References Books:

1. Dr. B.R.Gupta, "Generation of Electrical Energy", S.Chand Publication.
2. J.B.Gupta, "A Course in Power System", S.K.Kataria & Sons.

e-Learning Source:

https://nptel.ac.in/

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	2	1	3	-	-	-	3	-	-	-	-	-	2	-
CO2	2	1	3	-	-	-	3	-	-	-	-	-	2	-
CO3	2	1	3	-	-	-	3	-	-	-	-	-	2	-
CO4	2	1	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							
Course Code	DEE-451	**Title of the Course**	ELECTRICAL MACHINE LAB-I	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth			**3**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Application and verification of characteristic of DC motors 2. Working of different types of electrical machines.						

Course Outcomes	
CO1	N/Ia characteristics of DC series shunt and compound motors.
CO2	Polarity test of transformer.
CO3	Reversal of direction of rotation of compound motor.
CO4	Study of cumulative and differential compound motors.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	Measurement of induced emf and magnetising current under open circuit condition in D.C. generators.	3	1
Experiment-2	Determination of the relationship between terminal voltage and load current keeping speed constant for (a) Separately excited generator keeping excitation constant (b) D.C. shunt generator.	3	1
Experiment-3	To measure the variation in no load speed of a separately excited d.c. motor for the variation in (a) Armature circuit resistance (b) Field circuit resistance.	3	1
Experiment-4	Measurement of the speed of a d.c. series motor as a function of the load torque.	3	1
Experiment-5	(a) No-load and short circuit test on a single phase transformer. (b) Determination of efficiency and regulation of transformer.	3	2
Experiment-6	To determine the insulation resistance of a transformer at no load and at full laod condition.	3	2
Experiment-7	Determination of the magnetisation curve of an alternator (a) at no-load rated speed,(b) at no load half rated speed and (c) at full non-inductive load and rated speed.	3	2
Experiment-8	Determination of the relationship between terminal voltage and load current of an alternator keeping exitation and speed constant..	3	3
Experiment-9	Determination of regulation and efficiency of an alternator from open circuit and short circuit tests.	3	3
Experiment-10	Parallel operation of polyphase alternators and load sharing.	3	4

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	-	2	2	2	-	-	2	2	-	2	-	-	2	-
CO2	-	2	3	2	-	-	-	2	-	2	-	-	2	-
CO3	-	3	2	2	-	-	2	2	-	2	-	-	2	-
CO4	-	2	2		-	-	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							
Course Code	DEE-452	**Title of the Course**	ELECTRONICS LAB-II	**L**	**T**	**P**	**C**
Year	Second	**Semester**	Fourth			**3**	**-**
Pre-Requisite		**Co-requisite**					
Course Objectives	1. Performance characteristic of single phase Induction motor. 2. Operation of Universal motor under different types of supply.						

Course Outcomes	
CO1	Identification of different ICs.
CO2	Verification of truth table of different logic gates.
CO3	Operation of op-amp for different mathematical operations.
CO4	Verification of logic circuit of adder, subtractor and flip-flop.

Experiment No.	Experiment	Contact Hrs.	Mapped CO
Experiment-1	Familiarisation with bread-board. Familiarisation with TTL and MOS ICs.	3	1
Experiment-2	Identification of IC-Nos, pin nos, IC types.	3	2
Experiment-3	To observe that logic low and logic high do not have same voltage value delay of TTL logic gate.	3	2
Experiment-4	Observation of differences between MOS and TTL gates under the following heads: (a) Logic levels (b) Operating voltages. (c) Propagation delay.	3	2
Experiment-5	Use of Op-Amp.(for IC 741) as inverting and noninverting amplifier, adder, comparator, buffer, scale changer.	3	2
Experiment-6	Use of IC 755 as timer. Display Devices and Associated Circuits	3	2
Experiment-7	Familiarisation and use of different types of LEDs common anode and common cathode seven segment display Logic Gates	3	2
Experiment-8	Verification of truth tables for 2 Input NOT, AND, OR NAND,NOR, XOR GATES.	3	3
Experiment-9	To construct half adder and half subtractor using XOR and NAND gates verification of their truth tables.	3	3
Experiment-10	To construct a full adder circuit with XOR and NAND gates. (a) Study of 3 bit adder circuit implemented with OR and NAND Gates. (b) To construct 4 bit adder and full subtractor using full adder chip 7480 and NAND gates.	3	3
Experiment-11	(a) to verify the truth table of 4 bit adder IC chip 7483 (b) to construct the 4 bit adder/ 2 complement subtraction using 7483 and NAND gates.	3	3
Experiment-12	Flips Flops.: to verify the truth table for selected positive edge triggered and negative edge triggered F/F of J-K and D type	3	4

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	-	-	2	-	-	-	3	-
CO4	-	-	2	-	-	-	-	-	2	-	-	-	3	-

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

Name & Sign of Program Coordinator	Sign & Seal of HoD

Effective from Session: 2011-12							
Course Code	DEE-453	**Title of the Course**	Elementary Civil Engineering Lab	**L**	**T**	**P**	**C**
Year	II	**Semester**	IV	**0**	**0**	**3**	
Pre-Requisite	DEE-453	**Co-requisite**	NA				
Course objectives	The objective of the Elementary Civil Engineering Lab course is to provide practical exposure to basic civil engineering concepts and tests, enhancing their understanding relevant to electrical infrastructure.						

Course Outcomes	
CO1	Identify the different instruments for linear measurement
CO2	Know the working of linear measurement
CO3	Identify the different instruments for levelling
CO4	Record and observing necessary observations with the survey instruments

Unit No.	Title of the Unit		Contact Hrs.	MappedCO
1	**Experiment No-1**	Ranging a line	3	CO-1
2	**Experiment No-2**	Chaining a line	3	CO-2
3	**Experiment No-3**	Taking offset on the chain line and recording the field book.	3	CO-3
4	**Experiment No-4**	To find the difference in level between several points by single setting by the use of dumpy level.	3	CO-4
5	**Experiment No-5**	To find the difference in level between two distant points by **a.** Rise & Fall method **b.** Line of collimation method	3	CO-2

References Books:

1. Lab manual of University Polytechnic

e-Learning Source:

1. https://youtu.be/XwfNtUQyeAg?si=B1UWteO2O4UJ8rPY

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	-	1	1	2	-	-	-	-	-	-	-	-	-	-			3		1	3
CO2	-	1	1	2	-	-	-	-	-	-	-	-	-	-			2		3	2
CO3	-	1	1	2	-	-	-	-	-	-	-	-	-	-			1		1	1
CO4	-	1	1	2	-	-	-	-	-	-	-	-	-	-			3		2	3

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

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