Name of Faculty **Lata Yadav**
Discipline **Electrical Engineering**
Semester **4th** **:**
Subject **Electrical Machine-I**
Lesson plan duration : 15 weeks
Work Load(Lecture/Practical) per week : Lectures-04, Practicals-02

Week	Theory		Practical	
	Lecture Day	Topic(including assignment/test)	Practical day	Topic
1st	1st (Unit-1)	• Discuss Learning outcomes of Electrical Machine subject.	1st	• Introduction of EM lab various specifications of Motors, safety precautions etc.
	2st	• Introduction to Electrical Machines		
		• Definition of motor and generator, concept of torque		
	3rd	• Electro-magnetically induced emf.		
	4th	• Torque development due to alignment of two fields and the concept of torque angle		
2nd	5th	• Elementary concept of an electrical machine	2nd	Measurement of the angular displacement of the rotor of a slip-ring induction motor on application of DC to stator of motor winding in sequence and simultaneously to each phase of rotor winding
	6th	• Comparison of generator and motor		
	7th(Unit-II)	• Introduction of DC machines, its types		
	8th	• Construction of DC machines		
3rd	9th	• Armature winding and its types	3rd	Speed control of dc shunt motor
	10th	• Commutator and its function for generator and motor action		(i) Armature control method
	11th	• Factors determining induced EMF		(ii) Field control method
	12th	• Factors determining electromagnetic torque		
4th	13th	• DC generator and its types	4th	Evaluation of above practical's.
	14th	• Voltage buildup in DC gen.		
	15th	• Back emf, its significance , relationship between terminal voltage and back emf		
	16th	• Armature reaction		
5th	17th	• Commutation methods to improve commutation	5th	Study of dc series motor with starter (to operate the motor

	18th	• Types of DC Motors, its performace, Characteristic of DC motors		
	19th	• Speed control of DC motors, starters for DC motors(3 point and 4 point)		
	20th	• Application of DC Motors, losses in DC machines		
6th	21th	• Swinburne's test to find out losses	6th	Study of 3 point starter for starting D.C. shunt motor.
		• First assignment will be given and tentative 1st sessional test/evaluation of sessional marks etc.		
	22th	• Display and analysis of sessional marks		
	23th(unit-3)	• Introduction of Transformers, types of T/Fm		
	24th	• Construction of single phase transformer,		
7th	25th	• Parts of a transformer	7th	To perform open circuit and short circuit test for determining: (i) equivalent circuit (ii) the regulation and(iii)efficiencyof a transformerfrom the data obtained from open circuit and short circuit test at full
	26th	• Working principle of transformer		
	27th	• EMF equation of T/fm		
	28th	• Transformer at no load and its phasor diagram		
8th	29th	• Transformer – neglecting voltage drop in the windings – Ampere turn balance – its phasor diagram	8th	Evaluation of above practicals.
	30th	• Mutual and leakage fluxes, leakage reactance		
	31th	• Transformer on load, voltage drops and its phasor diagram		
	32th	• Equivalent circuit diagrams of T/fm, Relation between induced emf and terminal voltage, regulation of a transformer mathematical relation		
9th	33th	• Losses in transformer, various tests OC/SC Test to find out these losses and efficiency etc.	9th	Revision of above practicals for left out students.
	34th	• Auto transformer, construction,working and its application		
	35th	• Different type of transformer including dry type transformer		
	36th	• second assignment will be given and tentative 2nd sessional test/evaluation of sessional marks etc		

10th	37th	• display and analysis of sessional marks.	10th	Checking the polarity of the windings of a three phase transformer and connecting the windings in various configurations
	38th (unit-4)	• construction of 3-phase transformer		
	39th	• accessories of transformers such as Conservator, breather,		
	40th	• BuchholzRelay, Tap Changer (off load and on load) (Brief idea)		
11th	41th	• Types of three phase transformer i.e. delta-delta, delta-star	11th	Finding the voltage and current relationships of primary and secondary of a three phase transformer under balanced load in various configurations conditions such as (a) Star-star (b) Star delta (c) Delta star (d) Delta-Delta
	42th	• ..star-delta,star-star.		
	43th	• Parallel operation of transformer, its need		
	44th	• Parallel operation conditions will be discussed		
12th	45th	• Any left out topic due to Cl/leave etc.	12th	Evaluation of above practicals.
	46th	• Same as above		
	47th	• Local visit to complaint centre to show parts /accessories of transformer		
	48th	• On load/off load tap changer		
13th	49th	• Distribution /power transformer	13th	Revision of above practicals for left out students if any.
	50th	• Cooling of transformer		
	51th	• 3rd assignment will be given		
	52th	• Previous state boards question will be carried out, any other left out topic		
14th	53th	• 3rd sessional test	14th	Viva-voce/preparation of practical sessional marks.
	54th	• Evaluation of 3rd test		
	55th	• Display/analysis of 3rd sessional test		
	56th	• Remedial will be taken if any shortcomings found		
15th	57th	• Remedial will be taken if any shortcomings found	15th	Viva-voce/preparation of practical sessional marks.
	58th	• Remedial will be taken if any shortcomings found		
	59th	• Remedial will be taken if any shortcomings found		
	60th	• Remedial will be taken if any shortcomings found		

Name of the Faculty **Parveen Mehra**
Discipline **ELECTRICAL ENGG.**
Semester **4TH**
Subject **ELECTRICAL ENGINEERING DESIGN & DRAWING-II**

Lesson plan duration : 15 weeks

Work Load (Lecture/Practical) per week: Practicals- 06

Week		Drawings
	Practical Periods	Topic (inculding test)
1st	1st	Introduction of Electrical Engg. Design. & Drawing.
	2nd	Unit 1 : (Contractor Control circuits) - To make the
	3rd	drawing sheet (Shemetic diagram and power wiring
	4th	Unit 1 : (Contractor Control circuits) - To make the
	5th	drawing sheet (Shemetic diagram and power wiring
	6th	diagram of 3-phase induction motor getting supply
2nd	7th	Unit 1 : (Contractor Control circuits) - To make the
	8th	drawing sheet (Shemetic diagram and power wiring
	9th	diagram of Forwarding/ reversing of a 3-phase induction
	10th	
	11th	Revision of previous making drawing sheets for left out
	12th	students if any and checking of making drawing sheets
3rd	13th	Unit 1 : (Contractor Control circuits) - To make the
	14th	drawing sheet (Shemetic diagram and power wiring
	15th	diagram of Two speed control of 3-phase induction motor.
	16th	Unit 1 : (Contractor Control circuits) - To make the
	17th	drawing sheet (Shemetic diagram and power wiring
	18th	diagram of Limit switch control of a 3-phase induction
4th	19th	Unit 1 : (Contractor Control circuits) - To make the
	20th	drawing sheet (Shemetic diagram and power wiring
	21st	diagram of Sequential operating of two motors using time
	22nd	Unit 1 : (Contractor Control circuits) - To make the
	23rd	drawing sheet (Shemetic diagram and power wiring
	24th	diagram of Manually generated star delta starter for 3-
5th	25th	Unit 1 : (Contractor Control circuits) - To make the
	26th	drawing sheet (Shemetic diagram and power wiring
	27th	diagram of Automatic star delta starter for 3-phase
	28th	
	29th	Class test for preparation of Ist sessional exam and
	30th	checking of previous drawing sheets.
6th	31st	
	32nd	
	33rd	Unit 2 : (Earthing) - Concept and purpose of earthing.
	34th	
	35th	Unit 2 : (Earthing) - Different types of earthing : To make
	36th	the drawing sheet of plate earthing.
7th	37th	
	38th	Unit 2 : (Earthing) - To make the drawing sheet of Pipe
	39th	earthing.
	40th	
	41st	Unit 2 : (Earthing) - Revision of previous making drawing
	42nd	sheets and check the making drawing sheets.
8th	43rd	Unit 2 : (Earthing) - Procedure of earthing, test of
	44th	materials required and costing and method of reducing
	45th	earth resistance.
	46th	
	47th	Unit 2 : (Earthing) - Relevant IS specifications of earth
	48th	electrode for earthing a transformer, a high building.
9th	49th	
	50th	Unit 2 : (Earthing) - Earthing layout of distribution
	51st	transformer.

	52nd	
	53rd	Unit 2 : (Earthing) - Substation earthing layout and
	54th	earthing materials and key diagram of 11KV sub station.
10th	55th	
	56th	Unit 2 : (Earthing) - Key diagram of 33KV, 66KV sub
	57th	stations.
	58th	
	59th	Unit 2 : (Earthing) - Key diagram of 132KV sub station and
	60th	preparation of IInd sessional exam.
11th	61st	
	62nd	Unit 3 : (Drawing and Machine Parts) : End cover of
	63rd	induction moter.
	64th	
	65th	Unit 3 : (Drawing and Machine Parts) : Rotor of a squirrel
	66th	cage induction motor.
12th	67th	
	68th	Unit 3 : (Drawing and Machine Parts) : Revision of End
	69th	cover, Rotor of a squirrel cage induction motor.
	70th	
	71st	Unit 3 : (Drawing and Machine Parts) : Field coil of a DC
	72nd	motor.
13th	73rd	
	74th	Unit 3 : (Drawing and Machine Parts) : Terminal plate of
	75th	an induction motor.
	76th	
	77th	Unit 3 : (Drawing and Machine Parts) : Motor body
	78th	(Induction motor) as per IS specifications.
14th	79th	
	80th	Unit 3 : (Drawing and Machine Parts) : Revision of above
	81st	three drawing sheets for left out students (in any).
	82nd	Unit 3 : (Drawing and Machine Parts) :Sliprings of 3-phase
	83rd	induction motor.
	84th	
15th	85th	Preparation of IIIrd sessional exam and checking of
	86th	previous drawing sheets (If any)
	87th	
	88th	Revision of all above making drawing sheets and
	89th	preparation of final Exam.
	90th	

Name of Faculty :Sh. Parveen Mehra
Discipline : Electrical Engineering
Semester : 4th
Subject : EMII
Lesson plan duration : 15 weeks
Work Load(Lecture/Practical) per week : Lectures-04 PRACTICAL 02

Week	Day	Theory Topic/ Assignment/ Test	No.	Practical
1st	1	**unit 1-Introduction to Electrical Measuring Instruments:**	1	Use of analog and digital multimeter for measurement of voltage, current (A.C/D.C) and resistance
	2	**Concept of measurement and instruments**		
	3	**Concept of measurement of electrical quantities and instruments for their measurements, sources of**		
	4	**Concept of measurement of electrical quantities and instruments for their measurements, sources of**		
2nd	1	**Types of electrical measuring instruments – indicating, integrating and recording type**	2	**Measurement of pressure by using LVDT**
	2	**Types of electrical measuring instruments – indicating, integrating and recording type**		
	3	**Essentials of indicating instruments – deflecting, controlling and damping torque**		
	4	**Essentials of indicating instruments – deflecting, controlling and damping torque**		
3rd	1	**revision/problem solving**	3	**To measure the value of earth resistance using earth tester.**
	2	**unit 2-Ammeters and Voltmeters (Moving coil and moving iron type):**		
	3	**Concept of ammeter and voltmeters and difference between them**		
	4	**Concept of ammeter and voltmeters and difference between them**		
4th	1	**Construction and working principles of moving Iron instruments**	4	**To measure power, power factor in a single-phase circuit, using wattmeter and power factor meter and to verify results with calculations.**
	2	**Construction and working principles of moving coil instruments**		
	3	**Merits and demerits, sources of error and application of these instruments**		
	4	**Merits and demerits, sources of error and application of these instruments**		
5th	1	**unit 3 -Wattmeters (Dynamometer Type)**	5	**Measurement of power and power factor of a three-phase balanced load by two wattmeter method.**
	2	**Construction, working principle, merits and demerits of dynamometer type wattmeter**		
	3	**Construction, working principle, merits and demerits of dynamometer type wattmeter**		
	4	**Construction, working principle, merits and demerits of Digital wattmeters.**		

6th	1	unit 4 -Energymeter	6	Measurement of voltage and frequency of a sinusoidal signal using CRO and draw wave shape of signal.
	2	Induction Type		
	3	Construction, working principle, merits and demerits of single-phase and three-phase energy meters		
	4	Errors and their compensation		
7th	1	Simple numerical problems	7	Measurement of power in a 3 phase circuit using CT, PT and 3-phase wattmeter.
	2	Construction and working principle of maximum demand indicators		
	3	Digital energy meter (diagram, construction and application)		
	4	unit 5 -Miscellaneous Measuring Instruments:		
8th	1	Construction, working principle and application of Meggar, Earth tester(analog and digital)	8	Use of LCR meter for measuring inductance, capacitance and resistance.
	2	Construction, working principle and application of Multimeter		
	3	Construction, working principle and application of Frequency meter (dynamometer type)		
	4	Construction, working principle and application of single phase power factor meter		
9th	1	Construction, working principle and application of synchroscope and phase sequence indicator	9	To record all electrical quantities from the meters installed in the institution premises.
	2	Construction, working principle and application of tong tester (Clamp-on-meter)		
	3	Instrument Transformers: Construction, working and applications		
	4	CT		
10th	1	PT	10	To measure Energy at different Loads using Single Phase Digital Energy meter
	2	revision/problem solving		
	3	unit 6-Electronic Instruments:		
	4	Cathode Ray Oscilloscope: Block diagram, working principle of CRO and its various controls. Applications		
11th	1	Cathode Ray Oscilloscope: Block diagram, working principle of CRO and its various controls. Applications	11	Measurement of temperature by using thermister/Thermal Imager
	2	Digital multi-meter (only block diagram) and Applications		
	3	unit 7 - LCR meters.		
	4	Study of LCR meters and their applications		

12th	2	unit 8-Power Measurements in 3-phase circuits	12	Calibration of single phase and three-phase energy meter
	3	Two wattmeter method in balanced and unbalanced circuits and simple problems		
	4	Two wattmeter method in balanced and unbalanced circuits and simple problems		
13th	1	Three wattmeter method	13	
	2	unit 9-Transducers :-		
	3	Introduction, Types of Transducers (1 phase,3 phase)		
	4	Basic concept of pressure measurements using transducers		Revision of practicals performed
14th	1	Basic concept of flow measurement, level measurement, using transducers	14	
	2	Basic concept of displacement measurement using transducers		
	3	unit 10-Measurement of Temperature		
	4	Different types of thermometers, thermocouple, resistance temperature detector and their		Revision of practicals performed
15th	1	Different types of thermometers, thermocouple, resistance temperature detector and their	15	
	2	revision/problem solving		
	3	revision/problem solving		Revision of practicals performed
	4	revision/problem solving		

Name of Faculty :Sh. Ravinder Kumar
Discipline : Electrical Engineering
Semester : 4th
Subject : DIGITAL ELECTRONICS
Lesson plan duration : 15 weeks
Work Load(Lecture/Practical) per week : Lectures-04 PRACTICAL 02

Week	Day	Theory Topic/ Assignment/ Test	No.	Practical
1st	1	Unit1: Introduction to Number Systems	1	Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
	2	Decimal, binary number system		
	3	octal, hexa-decimal number system		
	4	number systems and their inter-conversion		
2nd	1	Binary and Hexadecimal addition	2	Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
	2	subtraction and multiplication		
	3	1's and 2's complement methods of addition		
	4	1's and 2's complement methods of subtraction		
3rd	1	Revision/Problem solution	3	Verification and interpretation of truth table for AND, OR, NOT, NAND, NOR, X-OR gates
	2	Unit2: Gates Definition, symbol		
	3	truth tables for inverter, OR, AND,NAND,NOR and X-OR gates		
	4	truth tables for inverter, OR, AND,NAND,NOR and X-OR gates		
4th	1	equivalence circuits	4	Construction of Half Adder using gates
	2	equivalence circuits		
	3	equivalence circuits		
	4	Unit3: Introduction Boolean Algebra		
5th	1	Boolean Relations and their applications	5	Construction of Half Adder using gates
	2	Boolean Relations and their applications		
	3	De Morgan's Theorems		
	4	De Morgan's Theorems		
	1	K-Map up to four variables		Construction of Full Adder using gates

6th	2	K-Map up to four variables	6	
	3	Numerical based on K-Map		
	4	Unit4: Combinational Circuits		
7th	1	Half adder, Full adder	7	Construction of Full Adder using gates
	2	Half adder, Full adder		
	3	Encoder, Decorder		
	4	Encoder, Decorder		
8th	1	Multiplexer/Demultiplexer	8	To verify the truth table for JK flip flop
	2	Multiplexer/Demultiplexer		
	3	Introduction to Display Devices ; LED		
	4	LCD and 7-segment display		
9th	1	Class Test/Assignment	9	To verify the truth table for JK flip flop
	2	Revision/Problem solution		
	3	Unit5: Introduction to Flip-Flops		
	4	J-K Flip-Flop		
10th	1	R-S Flip-Flop	10	Construction and testing of any counter
	2	D-Type Flip-Flop		
	3	T-Type Flip-Flop		
	4	Applications of Flip-Flops		
11th	1	Revision/Problem solution	11	Construction and testing of any counter
	2	Unit6: Introduction to Shift Registers and Counters		
	3	Shift Registers		
	4	Shift Registers		
12th	1	Counters	12	
	2	Counters		Verification of operation of a 8-bit D/A Converter

	3	Unit7: A/D and D/A Converters		
	4	A/D converter ,Counter ramp method		
13th	1	successive approximation method of A/D Conversion	13	
	2	D/A converters, Binary weighted method		Verification of operation of a 8-bit D/A Converter
	3	R-2R D/A Converter method		
	4	Revision/Problem solution		
14th	1	Unit8:Semi-conductor Memories introduction	14	Revision/Checking of Files
	2	Semi-conductor Memories Types, merits, demerits		
	3	Semi-conductor Memories applications		
	4	Revision/Problem solution		
15th	1	Revision/Problem solution	15	Revision/Checking of Files
	2	Revision/Problem solution		
	3	Revision/Problem solution		
	4	Revision/Problem solution		

Name of Faculty- Mr. C P Arora

Discipline - Electrical

Semester - 4th

Subject - IMEE

Lesson Plan Duration - 15 Weeks

Workload- (04 lectures)

Week	Day	Topics
1st	1	**Unit 1 :Tools, Accessories** and instruments required for installation maintenance
	2	accessories and repair work Knowledge of Indian Electricity rules, safety codes,
	3	causes prevention of accidents, artificial respiration of an electrocuted person
	4	workmen's safety devices
2nd	1	Class test and revision
	2	**Unit 2 :Installation**, 2.1 Installation of transmission and Distribution Lines:
	3	Erection of steel structures, connecting jumpers, tee-off points, joints and dead ends
	4	crossing of roads, streets, power/telecommunication lines and
3rd	1	railway line crossings clearances; earthing of transmission lines and guarding,
	2	spacing and configuration of conductors:
	3	Arrangement for suspension and strain insulators, bird guards, anti-climbing devices and danger plates;
	4	Sizes of conductor, earth wire and guy wires.
	1	Laying of service lines, earthing, provision of service fuses,

	2	installation of energy meters
4th	3	2.2 Laying of Underground Cables:
	4	Inspection, storage, transportation and handling of cables
	1	cable handling equipment, cable laying depths and clearances from other services
	2	such as: water, sewerage, gas, heating and other mains,
5th	3	and also a series of power and telecommunication cables and coordination with these services
	4	excavation of trenches, direct cable laying, including laying of cable from the drum,
	1	laying cable in the trench, taking all measurements and making drawings,
	2	Back filling of trenches with earth or sand, Laying protective layer of bricks etc.
6th	3	Laying of cables into pipes and conduits and within buildings.
	4	Class test/ revision
	1	Problem solution
	2	2.3 Elementary idea regarding, inspection and handling of transformers;
7th	3	pole mounted substations, plinth mounted substations, grid substation, bus bars
	4	isolators, voltage and current transformers, lightning arrestors,
	1	control and relay panels, HT/LT circuit breakers, LT switches, installation of
	2	Power/distribution transformers, dehydration. Earthing system
8th	3	fencing of yard, equipment foundations and trenches etc.
	4	2.4 Testing of various electrical equipment such as electrical motor,

	1	transformers, cables, and generators, motor control centres, medium
	2	voltage distribution panels, power control center's, motor control center's,
9th	3	lighting arrangement, storage, pre-installation checks, connecting and
	4	starting, pre-commissioning checks, drying out
	1	Class test/ revision
	2	Problem solution
	3	**3 Maintenance**
10th	4	3.1 Types of maintenance, maintenance schedules, procedures
	1	3.2 Maintenance of Transmission and Distribution System
	2	Authorized persons, danger notice, caution notice, permit to work,
	3	arranging of shutdowns personally, temporary earthing, cancellation of permit and restoration of supply
11th	4	Patrolling and visual inspection of lines - points to be noted during patrolling from ground;
	1	special inspections and night inspections;
	2	Location of faults using Meggar, effect of open or loose neutral connections,
12th	3	provision of proper fuses on service lines and their effect on system,
	4	causes of dim and flickering lights
	1	3.3 Maintenance of Distribution Transformers
13th	2	Transformer maintenance and points to be attended to in respect of various items of equipment
	3	Checking of insulation resistance, transformer oil level and BDV test of oil, measurement of earth resistance

	4	3.4 Maintenance of Grid Substations, Checking and maintenance of busbars,
14^{th}	1	Isolating switches, HT/LT circuit breakers, LT switches. Power transformers
	2	3.5 Maintenance of Motors, over hauling of motors, preventive maintenance, trouble shooting of electric motors,
	3	3.6 Domestic Installation: Introduction;testing of electrical installation of a building, testing of insulation resistance to earth
	4	testing of insulation and resistance between conductors,
15^{th}	1	continuity or open circuit test
	2	Class test/ revision
	3	Viva-voice related to subject
	4	Revision/Review/Test of old HSBTE Papers