GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGINEERING**	Semester: **3RD**	Name of the Teaching Faculty: **NILAKANTHA NAIK** **LECT. IN ELECTRICAL ENGINEERING**
Subject: INTRODUCTION TO ELECTRICAL GENERATION SYSTEM	No. of classes allotted per week:**03**	Semester From date: **14.07.2025** To Date:**15 .11.2024** No. of Weeks:**18**
PRE-REQUISITE	Basic idea of electric generation systems i.e.thermal power plants: coal, gas/diesel and nuclear-based, large and micro-hydropower plants, solar and biomass based power plants, and wind power plants	
COURSE OUTCOMES	Explain the optimized working of the thermal power plant Describe the efficient operation of large hydropower plants. Describe the efficient operation micro hydropower plants. Select the adequate mix of power generation based on economic operation..	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Thermal Power Plants: Coal, Gas/Diesel and Nuclear-based	Whiteboard
	2ND	1.1 Layout and working of a typical thermal power plant with steam turbines and electric generators	Whiteboard
	3RD	1.2 Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas,	Whiteboard
2ND	1ST	Diesel, Nuclear fuels-fusion and fission action	Whiteboard
	2ND	1.3 Safe Practices and working of various thermal power plants: coalbased, gas- based	
	3RD	, diesel-based, and nuclear-based	Whiteboard
3RD	1ST	1.4 Functions of the following types of thermal power plants and their major auxiliaries	Whiteboard
	2ND	1.4.1 Coal fired boilers: fire tube and	Whiteboard
	3RD	water tube	Whiteboard
4TH	1ST	1.4.2 Gas/diesel based combustion engines	Whiteboard
	2ND	1.4.3 Types of nuclear reactors :Disposal of nuclear waste and nuclear shielding	Whiteboard
	3RD	Large Hydropower Plants	
5TH	1ST	2.1 Energy conversion process of hydro power plant	Whiteboard
	2ND	2.2 Classification of hydro power plant: High ,medium and low head	Whiteboard
	3RD	2.3 Construction and working of hydro turbines used in different types of	
6TH	1ST	hydro power plant	Whiteboard
	2ND	2.3.1 High head Pelton turbine	Whiteboard
	3RD	2.3.2 Medium head-Francis turbine	

7TH	1ST	QUIZ-1	Whiteboard
	2ND	2.3.3 Low head-Kaplan turbine	Whiteboard
8TH	1ST	2.4 Safe Practices for hydro power plants	Lecture notes
	2ND	2.5 Locations of these different types of large hydro power plants in India	Whiteboard
	3RD	Micro-Hydropower Plants	
9TH	1ST	3.1 Lay out of micro hydro power plants	Whiteboard
	2ND	3.2 Different types of micro-hydro turbines for different heads:	Whiteboard
	3RD	QUIZ-2	
10TH	1ST	3.2.1 Pelton turbines	Whiteboard
	2ND	3.2.2 Francis turbines	Whiteboard
	3RD	3.2.3 Kaplan turbines	Whiteboard
11TH	1ST	3.3 Locations of these different types of micro-hydro power plants in India	Lecture notes
	2ND	QUIZ-3	Whiteboard
	3RD	Economics of Power Generation and Interconnected Power System	
12TH	1ST	4.1 Related terms: connected load, firm power, cold reserve, hot reserve,	Whiteboard
	2ND	spinning reserve, base load and peak load plants; Load curve,	Lecture notes
	3RD	load duration curve, integrated duration curve	
13TH	1ST	4.2 Cost of generation: Average demand, maximum demand, demand factor,	Whiteboard
	2ND	plant capacity factor, plant use factor,	Lecture notes
14TH	1ST	diversity factor, load factor and plant load factor	
	2ND	4.3 Choice of number of generator units	Lecture notes
	3RD	4.4 Combined operation of power station Causes,	Whiteboard
15TH	1ST	Impact and reasons of Grid system fault: State grid,	Lecture notes
	2ND	QUIZ-4	Whiteboard
16th	1ST	national grid,	Whiteboard
		brownout	
	2ND	sample blackout regional and international level.	Lecture notes
	3RD	REVISION	Whiteboard
17th	1st	REVISION	Whiteboard
	2nd	REVISION	Whiteboard
18th	1st	DOUBT CLEAR	Whiteboard
	2nd	DOUBT CLEAR	Whiteboard
	3rd	DOUBT CLEAR	Whiteboard

LEARNINGRESOUCES:

1. Electrical Power Generation by Tanmoy Deb, Khanna Publishing House, Delhi.
2. Generation of Electrical Energy by B.R. Gupta, S. Chand & Co. New Delhi.
3. Wind Power Technologies by Rachel, Sthuthi; Earnest, Joshua, PHI Learning, New Delhi.
4. Solar Photovoltaics: Fundamentals, Technologies and Applications by Chetan Singh Solanki, PHI Learning, New Delhi.
5. Wind Energy Basics by Gipe Paul, Chelsea Green Publishing Co.
6. Wind Power Plants and Project Development by Wizelius, Tore, Earnest, Joshua, PHI.
7. A Course in Electrical Power by J.B. Gupta, S.K. Kataria and Sons, New Delhi.
8. A Course in Electrical Power by Soni, Gupta, Bhatnagar, Dhanpat Rai and Sons.

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GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGINEERING**	Semester: **3rd**	Name of the Teaching Faculty: **AUROBINDO GHOSE** **(Lecturer-Stage-II in Electrical Engineering, G. P Puri.)**
Subject: **ELECTRICAL CIRCUITS (EEPC203.TH2)**	No. of classes allotted per week:**03**	Semester From date: **14.07.2025** To Date: **15.11.2025** No. of Weeks:**18**
PRE-REQUISITE	Basic knowledge about current, electricity and simple mathematics.	
COURSE OUTCOMES	CO-1: Analyse basic electrical circuit laws and parameters. CO-2: Analyse Series & Parallel Single Phase A.C Circuits in steady-state conditions and perform problem analysis. CO-3: Analyse Three Phase Connections & Load and Perform Source Transformation,,Node Analysis & Mesh Analysis on Three Phase AC Circuits. CO-4: Ability to define, understand & explain D.C Network Theorems and solve problems. CO-5: Analyse the different types of Network Parameters and perform problem analysis.	

Week	Class Day	Theory Topics	DELIVERY METHOD
1ST	1ST	1.1 Generation of alternating voltage 1.2 Phasor representation of sinusoidal quantities	Whiteboard
	2ND	1.3 R, L, C circuit elements its voltage and current response	Whiteboard
	3RD	1.4 R-L, R-C, R-L-C combination of A.C series circuit 1.4.1 Impedance, reactance, impedance triangle 1.4.2 Power factor, active power, reactive power, apparent power	Whiteboard
2ND	1ST	1.4.3 Power triangle and vector diagram 1.4.4 Resonance, Bandwidth	Whiteboard
	2ND	1.4.5 Quality factor and voltage magnification in series R-L, R-C, R-L-C circuit	Whiteboard
	3RD	Numerical Problems on Module 1	Whiteboard
3RD	1ST	2.1.1 Impedance, reactance, phasor diagram, impedance triangle 2.1.2 Power factor, active power, apparent power, reactive power, power triangle	Whiteboard
	2ND	2.2 Resonance in parallel R-L, R-C, R-L-C circuit	Whiteboard
	3RD		Whiteboard

		2.3 Bandwidth, Quality factor and voltage magnification	
4TH	1ST	NUMERICAL PROBLEMS on Module 2	Whiteboard
	2ND	3.1 Phasor and complex representation of three phase supply 3.2 Phase sequence and polarity	Whiteboard
	3RD	3.3 Types of three-phase connections 3.4 Phase and line quantities in three phase star and delta system	Lecture notes
5TH	1ST	3.5 Balanced and unbalanced load 3.6 Neutral shift in unbalanced load 3.7 Three phase power, active, reactive and apparent power in star and delta system	Whiteboard
	2ND	NUMERICAL PROBLEMS on Module 3 and Assignment 1(Module1,2 &3)	Whiteboard
	3RD	4.1 Source transformation 4.2 Star/delta and delta/star transformation	Lecture notes
6TH	1ST	4.3 Mesh Analysis 4.4 Node Analysis	Whiteboard
	2ND	NUMERICAL PROBLEMS on Module 4	Whiteboard
	3RD	5.1 Superposition theorem 5.2 Thevenin's theorem	Lecture notes
7TH	1ST	5.3 Norton's theorem 5.4 Maximum power transfer theorem 5.5 Reciprocity Theorem	Whiteboard
	2ND	NUMERICAL PROBLEMS on Module 5 and Assignment 2(Module 4 &5)	Whiteboard
	3RD	NUMERICAL PROBLEMS on Module 5	Whiteboard
8TH	1ST	6.1 Open Circuit Impedance Parameters 6.2 Short Circuit Admittance Parameters, Transmission Parameters , Hybrid Parameters	Lecture notes
	2ND	6.3 Interrelationship of Two Port Network	Whiteboard
	3RD	6.4 Inter Connection of Two Port Network	Whiteboard
9TH	1ST	NUMERICAL PROBLEMS on Module 6	Whiteboard
	2ND	NUMERICAL PROBLEMS on Module 6	Whiteboard
	3RD	NUMERICAL PROBLEMS on Module 6 and Assignment 3 (Module 6)	Whiteboard
10TH	1ST	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	3RD	NUMERICAL PROBLEMS (QUESTION BANK)	Whiteboard
11TH	1ST	NUMERICAL PROBLEMS(QUESTION BANK)	Lecture notes

	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	3RD	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
12TH	1ST	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Lecture notes
	3RD	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
13TH	1ST	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Lecture notes
	3RD	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
14TH	1ST	NUMERICAL PROBLEMS (QUESTION BANK)	Whiteboard
	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Lecture notes
	3RD	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
15TH	1ST	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	2ND	NUMERICAL PROBLEMS(QUESTION BANK)	Whiteboard
	3RD	Numerical Problems(QUESTION BANK)	Whiteboard
16TH	1ST	Quiz and Assignment 1 Solving	Whiteboard
	2ND	Quiz and Assignment 2 Solving	Whiteboard
	3RD	Quiz and Assignment 3 Solving	Whiteboard
17TH	1ST	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Lecture notes
	2ND	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Whiteboard
	3RD	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Whiteboard
18TH	1ST	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Whiteboard
	2ND	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Lecture notes
	3RD	Discussion of SCTE&VT Previous Year Questions and Solving Numerical Problems of SCTE&VT Previous Year Questions.	Whiteboard

LEARNINGRESOUCES:

1.	Network Analysis, M. E. Van Valkenburg; Prentice Hall of India
2.	Electric Circuits; David A. Bell; Oxford University Press New Delhi.
3.	Electric Circuit Theory, Chattopadhyay, Rakshit S. Chand &. Co
4.	Network & Systems, D. Roy Choudhury Wiley Eastern Ltd
5.	Networks and Systems, Ashfaq Husain Khanna Publishing House
6.	Engineering Circuit Analysis, W. H. Hayt, J. E. Kemmerly, and S. M. Durbin, McGraw Hill
7.	Fundamentals of Electrical Engineering; S.B Lal Saxena and K.Dasgupta; Cambridge University Press Pvt. Ltd., New Delhi.
8.	Electrical Circuits; Joseph Edminister, Schaum's Outline, Tata McGraw Hill.

WEBSITERESOUCES:

https://nptel.ac.in/courses/108104139
https://onlinecourses.nptel.ac.in/noc23_ee81/preview
https://nptel.ac.in/courses/108105479

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GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGINEERING**	Semester: **3RD**	Name of the Teaching Faculty: **NILAKANTHA NAIK** **LECT. IN ELECTRICAL ENGINEERING**
Subject: ELECTRICAL AND ELECTRONIC MEASUREMENT	No. of classes allotted per week:**3**	Semester From date: **14.07.2025** To Date: **15.11.2025** No. of Weeks:**18**
PRE-REQUISITE	Basic knowledge about atomic configuration of an atom , conductor, semiconductor, insulators, dielectric etc.	
COURSE OUTCOMES	CO1: To clarify the students on insulating , conducting & magnetic materials. CO2: To impact knowledge on the Physical, Electrical & Mechanical properties. CO3:To impact the knowledge on practical uses of various materials in different areas.	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Fundamentals of Measurements	Whiteboard
	2ND	1.1 Measurement: Significance, units, fundamental quantities and standards	Whiteboard
	3RD	1.2 Classification of Instrument Systems	Whiteboard
2ND	1ST	1.3 Null and deflection type instruments	Whiteboard
	2ND	1.4 Absolute and secondary instruments	Whiteboard
3RD	1ST	QUIZ-1	Whiteboard
	2ND	1.5 Analog and digital instruments	Whiteboard
	3RD	1.6 Static and dynamic characteristics, types of errors	Whiteboard
4TH	1ST	1.7 Calibration: need and procedure	Whiteboard
	2ND	1.8 Classification of measuring instruments: indicating, recording and integrating instruments	Whiteboard
5TH	1ST	1.9 Essential requirements of an indicating instruments	Whiteboard
	2ND	QUIZ-2	Whiteboard
6TH	1ST	Measurement of voltage and current	Whiteboard
	2ND	2.1 DC Ammeter: Basic, Multi range, Universal shunt	Whiteboard
7TH	1ST	2.2 DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity	Whiteboard
	2ND	2.3 AC voltmeter: Rectifier type (half wave and full wave)	Whiteboard
	3RD	2.4 CT and PT: construction, working and applications	Whiteboard
8TH	1ST	QUIZ-3	Lecture notes
	2ND	Measurement of Electric Power	Whiteboard
9TH	1ST	3.1 Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet	Whiteboard
	2ND	moving iron (PMMI) meter, their construction, working, salient features, merits and	Whiteboard

		demerits	
10TH	1ST	3.2 Dynamometer type wattmeter: Construction and working	Whiteboard
	2ND	3.3 Errors and compensations of PMMI,PMMC and Dynamometer type wattmeter	Whiteboard
	3RD	3.4 Active and reactive power measurement: One, two and three wattmeter method	Whiteboard
11TH	1ST	3.5 Effect of Power factor on wattmeter reading in two wattmeter method	Lecture notes
	2ND	3.6 Maximum Demand indicator(Definition only)	Whiteboard
12TH	1ST	QUIZ-1	Whiteboard
	2ND	Measurement of Electric Energy	Lecture notes
13TH	1ST	4.1 Single and three phase electronic energy meter: Constructional features and working principle	Whiteboard
	2ND	4.2 Errors and their compensations	Lecture notes
14TH	1ST	4.3 Calibration of single-phase electronic energy meter using direct loading.	
	2ND	QUIZ-1	Lecture notes
	3RD	Circuit Parameter Measurement, CRO and Other Meters	Whiteboard
15TH	1ST	5.1 Measurement of resistance	Lecture notes
	2ND	5.1.1 Low resistance: Kelvin's double bridge	Whiteboard
16th	1ST	5.1.2 Medium Resistance: Voltmeter and ammeter method	Whiteboard
	2ND	5.1.3 High resistance: Megger and Ohm meter: Series and shunt	Lecture notes
	3RD	5.2 Measurement of inductance using Anderson bridge (no derivation and phasor diagram)	Whiteboard
17th	1st	5.3 Measurement of capacitance using Schering bridge (no derivation and phasor diagram)	Whiteboard
	2nd	5.4 Single beam/single trace CRO (Working principle and block diagram only)	Whiteboard
18th	1st	5.5 Digital storage Oscilloscope: Basic block diagram, working, Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier, measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications.	Whiteboard
	2nd	5.6 Other meters: Earth tester, Digital Multimeter; L-C-R meter, Frequency meter (ferromagnetic and Weston type), Phase sequence indicator, power factor meter (single phase and three phase dynamometer type), Synchro scope, Tri-vector meter	Whiteboard
	3rd	5.7 Signal generator: need, working and basic block diagram.	Whiteboard

LEARNINGRESOUCES:

1. A Text Book of Electrical Technology Vol-I (Basic Electrical Engg.) by B. L. Theraja, A. K. Theraja, S.Chand and Co. New Delhi.
2. Basic Electrical Engineering by V. N. Mittle, Mc Graw-Hill New Delhi.
3. Electrical Technology by Edward Hughes, Pearson Education, New Delhi.
4. Electrical and Electronic Measurement and Instrumentation by R.K. Rajput, S.Chand and Co. New Delhi.
5. Electrical and Electronics Measurements and Instrumentation by A.K. Sawhney, Dhanpai Rai and Sons, New Delhi.
6. Electrical Measurements and Measuring Instruments by N.V. Suryanarayna, S.Chand and Co., New Delhi.

WEBSITERESOUCES:

https://youtu.be/vKKhxwn4P4o?si=nNQScOzJ8148VbQ1

Nilakantha Naik.
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14/07/2025
Principal
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09/07/2025
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GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGINEERING**	Semester: **3rd**	Name of the Teaching Faculty: **MR. PRASANJIT DAS** **SR.LECTURER IN ELECTRICAL ENGINEERING**
Subject: 4 DC Machine and Transformer	No. of classes allotted per week:**03**	Semester From date: **14.07.2025** To Date: **15.11.2025** No. of Weeks:**18**
PRE-REQUISITE	Basic knowledge about the construction, working principle & application of various Electrical D.C machines and Transformer.	
COURSE OUTCOMES	CO1:**DC Generators** CO2:**D.C. Motors** CO3:**Single Phase Transformers** CO4:**Three Phase Transformers** CO5:**Special Purpose Transformers**	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
14/7/25 to 19/7/25		**DC Generators**	
	1st	1.1 D.C. generator: construction, parts, materials and their functions	Whiteboard
	2nd	1.2 Principle of operation of DC generator	Whiteboard
	3rd	1.2.1 Fleming's right hand rule	Whiteboard
21/7/25 To 25/7/25	1ST	1.2.2 Derive the emf equation of DC Generator	Whiteboard
	2ND	1.2.3 Schematic diagrams of different types of DC generator	Whiteboard
	3RD	1.2.4 Armature reaction	Whiteboard
28/7/25 to 2/8/25	1ST	1.2.5 Commutation	Whiteboard
	2ND	1.2.6 Applications of D.C. generators	Whiteboard
	3RD	1.2.6 Applications of D.C. generators	Whiteboard
4/8/25 to 8/8/25		**QUIZ&ASSIGNMENT-I**	
		D.C. Motors	
	1st	2.1 D.C. motor: Types of DC motors	Whiteboard

	2nd	2.1.1 Fleming's left hand rule	Whiteboard
	3rd	2.1.2 Principle of operation of Back e.m.f. and its significance	
			Lecture notes
11/8/25 to 16/8/25	1ST	2.1.3 Voltage equation of DC motor	Whiteboard
	2ND	2.1.4 Torque and Speed; Armature torque, Shaft torque, BHP, Brake test, losses, efficiency	Lecture notes
	3RD	Doubt clear class	Whiteboard
			Lecture notes
18/8/25 to 22/8/25	1ST	2.2 DC motor starters: Necessity, two point and three point starters	Whiteboard
	2ND	2.2 DC motor starters: Necessity, two point and three point starters	Whiteboard
	3RD	2.3 Speed control of DC shunt and series motor: Flux and Armature control	Whiteboard
		QUIZ&ASSIGNMENT-	
25/8/25 to 30/8/25	1st	2.4 Brushless DC Motor: Construction and working	
		Single Phase Transformers	
	2nd	3.1 Types of transformers: Shell type and core type	Whiteboard
	3rd	3.2 Construction: Parts and functions	
1/9/25 to 6/9/25	1st	3.3 Materials used for different parts: CRGO, CRNGO, HRGO, amorphous cores	Whiteboard
	2ND	3.4 Transformer: Principle of operation	Whiteboard
	3RD	3.5 EMF equation of transformer: Derivation, Voltage transformation ratio	Whiteboard
8/9/25 to 12/9/25	1ST	3.6 Significance of transformer ratings	Whiteboard
	2ND	3.7 Transformer No-load and on-load phasor diagram, Leakage reactance	Whiteboard
	3RD	3.7 Transformer No-load and on-load phasor diagram, Leakage reactance	Whiteboard
15/9/25 To 20/9/25	1ST	3.8 Equivalent circuit of transformer: Equivalent resistance and reactance	Whiteboard
	2ND	3.8 Equivalent circuit of transformer: Equivalent resistance and reactance	Whiteboard
	3RD	3.9 Voltage regulation and Efficiency: Direct loading, OC/SC method, All day efficiency	Whiteboard
			Lecture notes
22/9/25 to 26/9/25	1ST	3.9 Voltage regulation and Efficiency: Direct loading, OC/SC method, All day efficiency	Whiteboard
		QUIZ&ASSIGNMENT-	
		Three Phase Transformers	
	2nd	4.1 Bank of three single phase transformers,(Y-Y,Δ-Δ ,Δ-Y, Y-Δ)	Whiteboard

	3rd	4.2 Single unit of three phase transformer	Whiteboard
3/10/25 to 04/10/25			Lecture notes
	1ST	4.3 Distribution and Power transformers: Construction and cooling,	Lecture notes
06/10/25 to 10/10/25			Lecture notes
	1ST	4.3 Distribution and Power transformers: Construction and cooling	Lecture notes
	2ND	4.3 Distribution and Power transformers: Construction and cooling	Whiteboard
	3RD	4.4 Criteria for selection of distribution transformer, and power transformer.	Whiteboard
13/10/25 To 18/10/25			
	1ST	. 4.5 Need of parallel operation of three phase transformer	Whiteboard
	2ND	4.6 Conditions for parallel operation	Whiteboard
	3RD	4.7 Polarity tests on mutually inductive coils and single phase transformers	Whiteboard
QUIZ&ASSIGNMENT			Lecture notes
20/10/25 To 25/10/25	1ST	4.8 Polarity test, Phasing out test on Three-phase transformer	Whiteboard
	2ND	4.8 Polarity test, Phasing out test on Three-phase transformer	Whiteboard
		Special Purpose Transformers	
	3rd	5.1 Single phase and three phase autotransformers: Construction, working and applications	Whiteboard
27/10/25 To 01/11/25	1st	5.1 Single phase and three phase autotransformers: Construction, working and applications	
	2nd	5.1 Single phase and three phase autotransformers: Construction, working and applications	
	3rd	5.2 Isolation transformer: Constructional Features and applications	
3/11/25 To 7/11/25	1st	5.2 Isolation transformer: Constructional Features and applications	
	2nd	5.2 Isolation transformer: Constructional Features and applications .	
	3rd	Doubt clear class	
10/11/25 To 15/11/25	1st	Doubt clear class	
	2nd	Doubt clear class	
	3rd	Doubt clear class	

LEARNINGRESOUCES:

1)Electrical Machines, Vol-I,II, by G.C.Garg & P.S.Bimbhra, Khanna Book Publishing House, New Delhi.
2)Basic Electrical Engineering by V.N.Mittle and Arvind. Mittle, McGraw Hill Education,NewDelhi.
3)Electrical Machines by D.P.Kothari, and I.J.Nagrath, McGraw Hill Education, NewDelhi.

WEBSITERESOUCES:

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LESSON PLAN OF ELECTRICAL CIRCUITS LABORATORY
EEPC213.PR2 ELECTRICAL CIRCUITS LABORATORY

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF ELECTRICAL ENGINEERING

DISCIPLINE – ELECTRICAL ENGINEERING	**3rd SEMESTER (2025-26)** **14.07.2025-15.11.2025(TENTATIVE)**	**FACULTY- LECT. AUROBINDO GHOSE** **(Lecturer-Stage-II in Electrical Engineering, G. P Puri.)**
Semester Course Duration- **18 weeks**	**No. of weeks-18, No. of days allotted per week-04 and Number of Periods allotted per Group in a week-02**	

Week	Practical Day of the Week	Experiment	Experiments to be covered as per syllabus of SCTEVT.	LEARNING RESOURCES PRESCRIBED BY SCTEVT.
1st	1st Group-A	Exp.1	Use voltmeter, ammeter, wattmeter to determine active, reactive and apparent power consumed in given R-L-C series circuit. Draw phasor diagram.	**1.** Network Analysis, M. E. Van Valkenburg; Prentice Hall of India **2.** Electric Circuits; David A. Bell; Oxford University Press New Delhi.
	2nd Group-B	Exp.1	Use voltmeter, ammeter, wattmeter to determine active, reactive and apparent power consumed in given R-L-C series circuit. Draw phasor diagram.	
	3rd Group-A	Exp.2	Use variable frequency supply to create resonance in given series R-L-C circuit or by using variable inductor or variable capacitor.	
	4th Group-B	Exp.2	Use variable frequency supply to create resonance in given series R-L-C circuit or by using variable inductor or variable capacitor.	
2nd	1st Group-A	Exp.3	Use voltmeter, ammeter, wattmeter, p.f meter to determine current, p.f., active, reactive and apparent power for given R-L-C parallel circuit with series connection of resistor and inductor in parallel with capacitor.	

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	2nd Group-B	Exp.3	Use voltmeter, ammeter, wattmeter, p.f meter to determine current, p.f., active, reactive and apparent power for given R-L-C parallel circuit with series connection of resistor and inductor in parallel with capacitor.	3. Electric Circuit Theory, Chattopadhyay, Rakshit S. Chand &. Co
	3rd Group-A	Exp.4	Use variable frequency supply create resonance in given parallel R-L-C circuit or by using variable inductor or capacitor	
	4th Group-B	Exp.4	Use variable frequency supply create resonance in given parallel R-L-C circuit or by using variable inductor or capacitor	
3rd	1st Group-A	Exp.5	Use voltmeter, ammeter, wattmeter, p.f meter to determine line and phase quantities of voltage and current for balanced three phase star and delta connected load and calculate active, reactive, and apparent power. Draw phasor diagram	
	2nd Group-B	Exp.5	Use voltmeter, ammeter, wattmeter, p.f meter to determine line and phase quantities of voltage and current for balanced three phase star and delta connected load and calculate active, reactive, and apparent power. Draw phasor diagram	
	3rd Group-A	Exp.6	Use voltmeter, ammeter to determine current through the given branch of a electric network by applying mesh analysis.	
	4th Group-B	Exp.6	Use voltmeter, ammeter to determine current through the given branch of a electric network by applying mesh analysis.	4.Network & Systems, D. Roy Choudhury Wiley Eastern Ltd
	1st Group-A	Exp.7	Use voltmeter, ammeter to determine current through the given branch of a electric network by applying node analysis.	

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EEPC213.PR2 ELECTRICAL CIRCUITS LABORATORY

4th	2nd Group-B	Exp.7	Use voltmeter, ammeter to determine current through the given branch of a electric network by applying node analysis.	5. Networks and Systems, Ashfaq Husain Khanna Publishing House
	3rd Group-A	Exp.8	Use voltmeter, ammeter to determine current through the given branch and voltage across the given element of circuit by applying superposition theorem.	
	4th Group-B	Exp.8	Use voltmeter, ammeter to determine current through the given branch and voltage across the given element of circuit by applying superposition theorem.	
5th	1st Group-A	Exp.9	Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Thevenin's theorem	
	2nd Group-B	Exp.9	Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Thevenin's theorem	
	3rd Group-A	Exp.10	Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Norton's theorem	6.Engineering Circuit Analysis, W. H. Hayt, J. E. Kemmerly, and S. M. Durbin, McGraw Hill
	4th Group-B	Exp.10	Use voltmeter, ammeter to determine equivalent circuit parameter in a given circuit by applying Norton's theorem	
	1st Group-A	Exp.11	Use voltmeter, ammeter to determine load resistance for maximum power transfer for a given circuit by applying maximum power transfer theorem.	

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6th	2nd Group-B	Exp.11	Use voltmeter, ammeter to determine load resistance for maximum power transfer for a given circuit by applying maximum power transfer theorem.	7.Fundamentals of Electrical Engineering; S.B Lal Saxena and K.Dasgupta; Cambridge University Press Pvt. Ltd., New Delhi.
	3rd Group-A	Exp.12	Use the node-voltage method to solve a circuit that containing resistors and independent and dependent current sources and voltage sources is connected between non-reference nodes using Simulink Simscape	
	4th Group-B	Exp.12	Use the node-voltage method to solve a circuit that containing resistors and independent and dependent current sources and voltage sources is connected between non-reference nodes using Simulink Simscape	
7th	1st Group-A	Exp.13	Use the mesh-current method to solve a circuit for an arbitrary network containing resistors and independent and dependent voltage and current sources using Simulink Simscape	
	2nd Group-B	Exp.13	Use the mesh-current method to solve a circuit for an arbitrary network containing resistors and independent and dependent voltage and current sources using Simulink Simscape	
	3rd Group-A	Exp.14	Using Simulink, determine A.C voltage and current response in given R, L, C circuit.	
	4th Group-B	Exp.14	Using Simulink, determine A.C voltage and current response in given R, L, C circuit.	
8th	1st Group-A	Exp.15	Using Simulink, create resonance in given series R-L-C circuit	8.Electrical Circuits; Joseph Edminister, Schaum's Outline, Tata McGraw Hill.
	2nd	Exp.15	Using Simulink, create resonance in given series R-L-C circuit	

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	Group-B			9. Agam Kumar Tyagi, "MATLAB and Simulink for Engineers", OXFORD Higher Education.
	3rd Group-A	Exp.16	Verify network theorems(Superposition, Thevenin's, Norton's, Maximum power transfer) using Simulink Simscape	
	4th Group-B	Exp.16	Verify network theorems(Superposition, Thevenin's, Norton's, Maximum power transfer) using Simulink Simscape	
9th	1st Group-A	Exp.1 & 2	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp.1 & 2	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
10th	1st Group-A	Exp. 5 & 6	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 5 & 6	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 7 & 8	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	10.Dr. Shailendra Jain, "Modeling& Simulation using MATLAB – Simulink", Wiley – India.
	4th		Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	

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	Group-B	Exp. 7& 8		
11th	1st Group-A	Exp. 9 & 10	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 9 & 10	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 11 & 12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 11 & 12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
12th	1st Group-A	Exp. 13 & 14	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 13 & 14	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 15 & 16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 15 & 16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
13th	1st Group-A	Exp.1 & 2	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd		Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	

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	Group-B	Exp.1 & 2		
	3rd Group-A	Exp. 3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
14th	1st Group-A	Exp. 5 & 6	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 5 & 6	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 7 & 8	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 7& 8	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
15th	1st Group-A	Exp. 9 & 10	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 9 & 10	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 11 & 12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	

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	4th Group-B	Exp. 11 & 12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
16th	1st Group-A	Exp. 13 & 14	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp. 13 & 14	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 15 & 16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 15 & 16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
17th	1st Group-A	Exp.1,2,3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	2nd Group-B	Exp.1,2,3 & 4	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp. 5,6,7 & 8	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp. 5,6,7 & 8	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
18th	1st Group-A	Exp. 9,10,11 & 12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	

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	2nd Group-B	Exp.9,10,11 &12	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	3rd Group-A	Exp.13,14,15 &16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	
	4th Group-B	Exp.13,14,15 &16	Doubt Solving & Progressive Practical Tests/Progressive Practical Assessments	

Signature of Faculty

9/7/25

Signature of H.O.D

9/7/25.

Signature of Principal

GOVERNMENT POLYTECHNIC, PURI
DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGINEERING**	Semester: **3RD**	Name of the Teaching Faculty: **NILAKANTHA NAIK** **LECT. IN ELECTRICAL ENGINEERING**
Subject: ELECTRICAL & ELECTRONIC MEASUREMENT LAB	No. of classes allotted per week:**04**	Semester From date: **14.07.2025** To Date: **15.11.2025** No. of Weeks:**18**
PRE-REQUISITE	Basic knowledge deals with the technique of measuring voltage, current and wattage by the indicating type of instruments.	
COURSE OUTCOMES	Check the working of the electrical measuring instrument. Different types of measuring instruments for measuring voltage and current. Different types of measuring instruments for measuring electric power Different types of measuring instruments for measuring electric energy. CRO for the Measurement of supply frequency in single-phase circuit.	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	1. Identify measuring instruments on the basis of symbols on dial, type, accuracy, class position and scale .Gr. A	Performed in Laboratory
	2ND	1. Identify measuring instruments on the basis of symbols on dial, type, accuracy, class position and scale. Gr. B	Performed in Laboratory
	3RD	2. Identify the components of PMMC and MI instruments. Gr. B	Performed in Laboratory
	4TH	2. Identify the components of PMMC and MI instruments. Gr. A	Performed in Laboratory
2ND	1ST	3. Extend range of ammeter and voltmeter by using (i) shunt and multiplier. Gr. A	Performed in Laboratory
	2ND	3. Extend range of ammeter and voltmeter by using (i) shunt and multiplier. Gr. B	Performed in Laboratory
	3RD	3. Extend range of ammeter and voltmeter by using (i) shunt and multiplier. Gr. B	Performed in Laboratory
	4TH	3. Extend range of ammeter and voltmeter by using (i) shunt and multiplier. Gr. A	Performed in Laboratory
3RD	1ST	4. Use electro-dynamic watt-meter for measurement of power in a single phase circuit. Gr. A	Performed in Laboratory
	2ND	4. Use electro-dynamic watt-meter for measurement of power in a single phase circuit. Gr. B	Performed in Laboratory
	3RD	4. Use electro-dynamic watt-meter for measurement of power in a single phase circuit. Gr. B	Performed in Laboratory

	4TH	4. Use electro-dynamic watt-meter for measurement of power in a single phase circuit. Gr. A	Performed in Laboratory
4TH	1ST	5. Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load. Gr. A	Performed in Laboratory
	2ND	5. Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load. Gr. B	Performed in Laboratory
	3RD	5. Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load. Gr. B	Performed in Laboratory
	4TH	5. Use single three phase wattmeter for measurement of active and reactive power of three phase-balanced load. Gr. A	Performed in Laboratory
5TH	1ST	6. Use two wattmeters for measuring active power of three-phase balanced load. Gr. A	Performed in Laboratory
	2ND	6. Use two wattmeters for measuring active power of three-phase balanced load. Gr. B	Performed in Laboratory
	3RD	6. Use two wattmeters for measuring active power of three-phase balanced load. Gr. B	Performed in Laboratory
6TH	1ST	6. Use two wattmeters for measuring active power of three-phase balanced load. Gr. A	Performed in Laboratory
	2ND	7. Calibrate single-phase electronic energy meter by direct loading. Gr. B	Performed in Laboratory
	3RD	7. Calibrate single-phase electronic energy meter by direct loading. Gr. B	Performed in Laboratory
	4TH	7. Calibrate single-phase electronic energy meter by direct loading. Gr. A	Performed in Laboratory
7TH	1ST	7. Calibrate single-phase electronic energy meter by direct loading. Gr. A	Performed in Laboratory
	2ND	8 Use Kelvin's double bridge for measurement of low resistance. Gr. A	Performed in Laboratory
8TH	1ST	8 Use Kelvin's double bridge for measurement of low resistance. Gr. A	Performed in Laboratory
	2ND	8 Use Kelvin's double bridge for measurement of low resistance. Gr. B	Performed in Laboratory
	3RD	8 Use Kelvin's double bridge for measurement of low resistance. Gr. B	Performed in Laboratory
9TH	1ST	9. Use voltmeter and ammeter method for measurement of medium resistance. Gr. A	Performed in Laboratory
	2ND	9. Use voltmeter and ammeter method for measurement of medium resistance. Gr. B	Performed in

			Laboratory
	3RD	9. Use voltmeter and ammeter method for measurement of medium resistance. Gr. B	Performed in Laboratory
	4TH	9. Use voltmeter and ammeter method for measurement of medium resistance. Gr. A	Performed in Laboratory
10TH	1ST	10. Use Megger for insulation resistance measurements. Gr. A	Performed in Laboratory
	2ND	10. Use Megger for insulation resistance measurements. Gr. B	Performed in Laboratory
	3RD	10. Use Megger for insulation resistance measurements. Gr. B	Performed in Laboratory
	4TH	10. Use Megger for insulation resistance measurements. Gr. A	Performed in Laboratory
11TH	1ST	11. Use earth tester for measurement of earth resistance. Gr. A	Performed in Laboratory
	2ND	11. Use earth tester for measurement of earth resistance. Gr. B	Performed in Laboratory
	3RD	11. Use earth tester for measurement of earth resistance. Gr. B	Performed in Laboratory
	4TH	11. Use earth tester for measurement of earth resistance. Gr. A	Performed in Laboratory
12TH	1ST	12. Use Tri-vector meter for measuring kW, kVAr and kVA of a power line. Gr. A	Performed in Laboratory
13TH	1ST	12. Use Tri-vector meter for measuring kW, kVAr and kVA of a power line. Gr. B	Performed in Laboratory
	2ND	12. Use Tri-vector meter for measuring kW, kVAr and kVA of a power line. Gr. B	Performed in Laboratory
	3RD	12. Use Tri-vector meter for measuring kW, kVAr and kVA of a power line. Gr. A	Performed in Laboratory
14TH	1ST	13. Study of Resolution and sensitivity of Digital Instrument. Gr. A	Performed in Laboratory
	2ND	13. Study of Resolution and sensitivity of Digital Instrument. Gr.B	Performed in Laboratory
	3RD	13. Study of Resolution and sensitivity of Digital Instrument. Gr.B	Performed in Laboratory
	4TH	13. Study of Resolution and sensitivity of Digital Instrument. Gr. A	Performed in Laboratory
15TH	1ST	14. Measure the unknown frequency and phase angle, using	Performed in

		CRO by Lissajous figure. Gr. B	Laboratory
	2ND	14. Measure the unknown frequency and phase angle, using CRO by Lissajous figure. Gr. B	Performed in Laboratory
	3RD	14. Measure the unknown frequency and phase angle, using CRO by Lissajous figure. Gr. A	Performed in Laboratory
16th	1ST	14. Measure the unknown frequency and phase angle, using CRO by Lissajous figure. Gr. A	Performed in Laboratory
	2ND	Revision	Performed in Laboratory
	3RD	Revision	Performed in Laboratory
	4TH	Revision	Performed in Laboratory
17th	1ST	Revision	Performed in Laboratory
	2ND	Revision	Performed in Laboratory
	3RD	Revision	Performed in Laboratory
18th	1ST	Revision	Performed in Laboratory
	2ND	Revision	Performed in Laboratory
	3RD	Revision	Performed in Laboratory
	4TH	Revision	Performed in Laboratory

ARNINGRESOUCES:

REFERENCES:

1. A Text Book of Electrical Technology Vol-I (Basic Electrical Engg.) by B. L. Theraja, A. K. Theraja, S.Chand and Co. New Delhi.
2. Basic Electrical Engineering by V. N. Mittle, Mc Graw-Hill New Delhi.
3. Electrical Technology by Edward Hughes, Pearson Education, New Delhi.
4. Electrical and Electronic Measurement and Instrumentation by R.K. Rajput, S.Chand and Co. New Delhi.
5. Electrical and Electronics Measurements and Instrumentation by A.K. Sawhney, Dhanpai Rai and Sons, New Delhi.
6. Electrical Measurements and Measuring Instruments by N.V. Suryanarayna, S.Chand and Co., New Delhi.

Nilakantha Naik.

Sign. of Facultyconcerned

14/07/2025

Principal

09/07/2025

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