

GOVERNMENT POLYTECHNIC BAIKUNTHAPUR, DISTT. KOREA, CHHATTISGARH - 497335
 COURSE COMPLETION UNIT PLAN, SESSION JANUARY JUNE 2025

DEPARTMENT: ELECTRICAL ENGINEERING
 SEMESTER: 06th
 LECTURER NAME: KUMAR GOSWAMI
 SUBJECT: WIND AND SOLAR POWER TECHNOLOGY
 2024672 (024)

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	EXPECTED DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARKS
Chapter 01 : Renewable Energy Sources						
I	Various sources of Energy - Conventional and Non - conventional.	02	21/01/2025 22/01/2025	21/01/2025 22/01/2025	Various Source of energy - C. & N.C	
II	Importance of Non - Conventional Energy Sources	02	23/01/2025 24/01/2025	23/01/2025 24/01/2025	Importance of N.C.	
III	Energy Chain - Energy Flow block diagram from primary energy source to final energy consumption via electrical and non - electrical route.	02	27/01/2025 28/01/2025	27/01/2025 28/01/2025	Energy chain Energy flow E.P.A.O.B.D. flow of final Con.	
IV	Advantages and disadvantages of conventional energy sources.	02	30/01/2025 31/01/2025	30/01/2025 31/01/2025	Advantages & Disadvantages of conventional energy	
V	Salient features of Non - conventional energy Sources.	02	03/02/2025 04/02/2025	03/02/2025 04/02/2025	Salient Features of Conventional energy sources	
VI	Green Power- Definition and advantages.	02	05/02/2025 06/02/2025	05/02/2025 06/02/2025	Green Power -	
Chapter 02 : Wind Energy						
I	Wind Energy - Introduction	01	07/02/2025	07/02/2025	Wind Energy: Introduction	
II	Variation of wind speed with height- existing formula and related plot	03	10/02/2025 11/02/2025 12/02/2025	10/02/2025 11/02/2025 12/02/2025	Velocity of wind speed with height - related	
III	Estimation of wind energy at a site - Power in wind, empirical formula, Wind speed duration curve, Power versus wind speed characteristics.	03	13/02/2025 14/02/2025 15/02/2025	13/02/2025 14/02/2025 15/02/2025	Estimation of wind energy at a site - power empirical formula wind speed characteristics.	
IV	Capacity Factor of a Wind power plant - Definition and formula.	03	18/02/2025 19/02/2025 20/02/2025	18/02/2025 19/02/2025 20/02/2025	Capacity factor of a wind power plant	
V	Selection of Site for a Wind Power Plant- Factors effecting	03	24/02/2025 25/02/2025 26/02/2025	24/02/2025 25/02/2025 26/02/2025	Selection of a site for a wind power plant	

	wind power generation, important features.					
VI	Important terms and definitions used in wind power plants - Blade, Chord, Wind Velocities, Angle of attack, Pitch angle (Blade setting angle), drag force, Lift force, Solidity.	04	28/02/2025 to 06/03/2025	28/02/2025 03/03/2025 04/03/2025 06/03/2025	Blade chord, wind velocity, angle of attack, pitch angle, Drag force, Lift force.	
VII	Elementary Fluid Flow concepts - nature of flow around a body, relative motion of fluid at the boundary wall, fluid friction, pressure difference, drag on a body, lift force.	03	07/03/2025 to 11/03/2025	07/03/2025 to 11/03/2025	Elementary Fluid Flow Concept - relative motion fluid friction, pressure difference, lift force.	
Chapter 03 : Power Generation						
I	Introduction- block diagram of wind energy conversion systems (WECS).	03	12/02/2025 to 13/02/2025	12/02/2025 13/02/2025	Introduction - Overview - Program of uses	
II	Wind Turbines - Types (based on power generation capacity and based on horizontal or vertical rotor axis).	02	14/02/2025	14/02/2025	Wind Turbines - Types. (vertical & horizontal axis)	
III	Horizontal Axis Wind Turbine (HAWT) - (a) Main Components and diagram- Turbine blades, Hub, Nacelle, Yaw Control Mechanism & Tower) (b) Types of Rotors-single or multiple blades, Teetering of Rotor, Upwind and downwind machines. (c) Yaw Control and Pitch control of Rotor.	03	14/02/2025 to 18/02/2025	14/02/2025 to 18/02/2025	Horizontal axis wind turbine (a) - Turbine blade, Hub, Nacelle, Yaw control (b) - Rotor - single or multiple blade, upwind and downwind (c) - Yaw control	
IV	Vertical Axis Wind Turbine (VAWT) -	01			Vertical Axis wind turbine	

	(a) Main Components - Tower, Blades, support structure (b) Rotors-Types & construction in brief.	02	19/03/2025	19/03/25	(b) - Rotor-Types & Construction in brief
VI	HAWT versus VAWT - Advantages and disadvantages	01	20/03/2025	20/03/2025	Hawt versus VAWT advantages and disadva.
VII	Speed Control strategies for wind turbines - Yaw and tilt control, pitch control and stall control.	01	22/03/2025	22/03/2025	Speed Control strategies for wind turbines - yaw and tilt control
VIII	Power speed characteristics in various speed region.	01	24/03/2025	24/03/2025	Power speed char's in various speed region
IX	Generators Suitable for Wind Power Generation - DC, Synchronous and Induction generators, advantages and disadvantages.	01	25/03/2025	25/03/2025	generator suitable for wind power generation - DC synch and Ind gen.
X	Fixed speed drive scheme - power output versus wind speed characteristics	01	29/03/2025	29/03/2025	Fixed speed drive scheme, Power of generating speed
XI	Variable speed drive scheme - (a) Variable speed drive using power electronics. (b) Scherbius Variable speed drive - block diagram. (c) Variable speed direct drive - advantages and disadvantages	02	29/03/2025	28/03/2025	Variable speed drive scheme - (a) - Variable speed drive using P.E (b) - Scherbius Variable speed drive (c) - Variable speed direct drive
XII	System Integration - Effect of wind speed and grid condition.	01	29/03/2025	29/03/2025	System integration - effect of wind speed and grid condition
XIII	Wind energy storage - Major problems and remedies.	01	31/03/2025	31/03/2025	wind energy storage - major problems and remedies
XIV	Environmental aspects of wind power.	01	01/04/2025	01/04/2025	Environmental aspect of wind power
Chapter 04 : PV cell					
I	PV cell characteristics and its equivalent circuit. Types of	01	02/04/2025	02/04/25	PV cell char's and its eq. circuit. Types of

II	material used for PV cells: Data sheet of PV cell with emphasis on short circuit current, open circuit voltage, peak power, cell efficiency parameters.	02	04/04/2025	04/04/25	04/04/25	emphasis for PV cell Data sheet of PV cell with emphasis of s.c. current, O.C. voltage
III	Effect of temperature on PV cell.	01	07/04/2025	07/04/2025	07/04/2025	effect of temp. on PV cell.
IV	Connection of Identical and non-identical PV cells in series.	01	08/04/2025	08/04/2025	08/04/2025	Comparison of Identical and non-identical PV cells in series
V	Connection of Identical and non-identical PV cells in parallel.	01	09/04/2025	09/04/2025	09/04/2025	Comparison of Identical and non-identical PV cells in parallel.
VI	Protecting series and parallel connected PV cells.	01	10/04/2025	10/04/2025	10/04/2025	Protecting series and parallel connected PV cells.
VIII	Interconnection of modules in series and parallel.	01	11/04/2025	11/04/2025	11/04/2025	Interconnection of modules in series & parallel.
Chapter 05 : Energy from sun and sizing of PV						
I	Insolation and irradiance and Insolation variation with time of a day.	02	14/04/2025	14/04/2025	14/04/2025	Insolation and irradiance and Insolation variation with time
II	Insolation and energy on a horizontal flat plate.	01	15/04/2025	15/04/2025	15/04/2025	Insolation and energy on a horizontal flat plate
III	Atmospheric effects.	01	16/04/2025	16/04/2025	16/04/2025	Atmospheric effects.
IV	Introduction to Batteries, Battery capacity, Battery C rate, Battery efficiency, Energy and power densities.	02	21/04/2025	22/04/2025	22/04/2025	Introduction to Battery, Battery Capacity, Battery C rate, Battery efficiency.
V	Battery selection, Battery and PV sizing for a domestic / commercial application considering days of autonomy	02	24/04/2025	25/04/2025	25/04/2025	Battery selection, Battery & PV Sizing for a domestic / commercial application,

REFERENCE BOOKS

S NO.	TITLE	AUTHOR
1.	Non-conventional Source	G D Rai / Khanna Publication
2.	Non-conventional Source of Energy (Hindi)	V K Jain / Deepak Prakashan

3.	Non-Conventional Energy Sources and Utilisation	R K Rajput / S.Chand and company Pvt. Ltd.
4.	Wind and Solar Power Systems: Design, Analysis, and Operation	Mukund R. Patel / CRC Press
5.	Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers	Solanki, Chetan Singh / PHI Learning, New Delhi.
6.	Solar Photo Voltic's : Fundamentals, Technologies and Applications.	Solanki, Chetan Singh / PHI

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GOVERNMENT POLYTECHNIC BAIKUNTHPUR, DISTT. KOREA, CHHATTISGARH - 497335
 COURSE COMPLETION UNIT PLAN, SESSION JANUARY JUNE 2025

DEPARTMENT: ELECTRICAL ENGINEERING
 SEMESTER: 04TH
 LECTURER NAME: KUMAR GOSWAMI
 SUBJECT: ELECTRICAL ESTIMATION & COSTING
 2024475 (024)
 (THEORY)

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	EXPECTED DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARK
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Chapter 01 : Electrical Wiring

I	Wiring system, Types of wires.	01	29/02/2025	29/02/2025	wiring system, type of wire.	
II	Specifications of Different types of wiring materials, Accessories.	02	30/02/2025 31/02/2025	30/02/2025 31/02/2025	Specification of Different types of wires.	
III	Selection of material for wiring work.	02	05/02/2025 06/02/2025	05/02/2025 06/02/2025	Selection of material for wiring work.	
IV	Wiring tools.	01	09/02/2025	09/02/2025	wiring tools.	
V	Wiring circuits.	02	12/02/2025 13/02/2025	12/02/2025 13/02/2025	wiring circuit - power wiring system	
VI	Point wiring system (Short, Medium and Long).	01	14/02/2025	14/02/2025	Service line i style	
VII	Service line: single phase, three phase.	01	21/02/2025	21/02/2025	Domestic and Industrial panel wiring.	
VIII	Domestic and Industrial panel wiring.	01	29/02/2025	29/02/2025	I.E rule, 2003	
IX	I.E Act-2003, I.E. rules for wiring.	01	28/02/2025	28/02/2025		

Chapter 02 : Estimating and Costing Practices

I	Estimation and estimation tools.	01	06/03/2025	06/03/2025	Estimation and estimation tools	
II	Electrical Schedule of rates, catalogues, Survey and source selection, measurement book	01	07/03/2025	07/03/2025	Electrical Schedule of rate, Catalogue, source selection.	
III	Quantity and cost of material required.	01	08/03/2025	08/03/2025	Quantity and cost of material required.	
IV	Purchase system including GEM, Purchase enquiry and selection of purchase mode.	02	10/03/2025 11/03/2025	10/03/2025 11/03/2025	Purchase system including GEM, Purchase enquiry and selection of purchase mode.	

V	Comparative statement, Purchase orders, verification of bills.				Comparative statement, Purchase orders, verification of bills
VI	Contract system.	01	12/03/2025	12/03/2025	Contract system
	Tendering procedure and preparation of simple tender, Earnest Money, Security Deposit.	02	13/03/2025	13/03/2025	Tendering procedure and preparation of simple tender, Earnest Money, Security Deposit

Chapter 03 : Estimation and Costing of residential and industrial wiring

Residential wiring					
I	Layout	01	17/03/2025	17/03/2025	Layout
II	Load calculation	01	18/03/2025	18/03/2025	Load calculation
III	Wire, switchgear, Cable and other accessories & fixture/fitting selection	02	19/03/2025	19/03/2025	Wire, switchgear, Cable and other accessories and other accessories
IV	Earthing system	02	20/03/2025	20/03/2025	Earthing system
V	Overall Estimating and costing	01	24/03/2025	24/03/2025	Overall Estimating and costing

Commercial and industrial Wiring

VI	Layout	01	27/03/2025	27/03/2025	Layout
VII	Load calculation	01	28/03/2025	28/03/2025	Load calculation
VIII	Wire, switchgear, Cable and other accessories & fixture/fitting selection	02	31/03/2025	31/03/2025	Wire, switchgear, Cable and other accessories and other accessories & fixture/fitting selection
IX	Earthing system	01	01/04/2025	01/04/2025	Earthing system
X	Overall Estimating and costing	01	02/04/2025	02/04/2025	Overall Estimating and costing

Chapter 04 : Estimation and costing of Overhead and Underground Distribution System

I	Overhead distribution system.	01	07/04/2025	07/04/2025	Overhead Distribution system
II	Materials and accessories required for the overhead distribution system.	01	09/04/2025	09/04/2025	Material and accessories required for overhead distribution system
III	Distribution lines, Line supports, Factors governing height of pole.	02	10/04/2025	10/04/2025	Distribution lines, Line supports, Factor governing height of pole
IV	Conductor materials, size of conductor for overhead line, conductor's configuration, spacing and clearances, span lengths.	01	14/04/2025	14/04/2025	Conductor material, size of conductor configuration, spacing and clearances, span lengths

V	Cross arms, pole brackets, clamps, guys and stays, setting of stays	01	15/04/25	15/04/25	Cross Arm, pole clamps, setting of stay
VI	Overhead line insulators, insulator materials, lightning arrestors, erection of supports.	01	16/04/25	16/04/25	Overhead line Insulators Insulator material, each or of supports
VII	Earthing of lines, Guarding of overhead lines, Clearances of conductor from ground, Spacing between supports conductors.	02	17/04/25 18/04/2025	17/04/2025 18/04/2025	Earthing of overhead guarding of overhead line Spacing between supports conductor
VIII	I.E. rules pertaining to LV distribution lines.	01	21/04/2025	21/04/2025	I.E. rules pertaining to LV distribution line
IX	Estimate for 440 V, 3-phase, 4 wires or 3 wires overhead distribution system.	02	22/04/2025 28/04/2025	22/04/2025 28/04/2025	Estimate for 440V, 3P 4 wire or 3 wire. between types of service connection
X	Types of service connections.	01	24/04/2025	24/04/2025	Types of service connection
XI	Method of installation of service connection (1-phase and 3-phase)	01	25/04/2025	25/04/2025	Method of installation Service connection in
XII	I.E. rules pertaining to overhead lines and service connection.	01	26/04/2025	26/04/2025	I.E. rules pertaining to overhead line and service connection
XIII	Underground distribution System.	02	28/04/2025 29/04/2025	28/04/2025 29/04/2025	Underground distribut all
XIV	Materials and accessories required for underground distribution system.	02	30/04/2025 01/05/2025	30/04/2025 01/05/2025	material and accessories required for undergroun distribution for all
XV	Estimate for 440 V, 3 - phase, 4 wires or 3 wires underground distribution system.	01	02/05/2025	02/05/2025	Estimate for 440V, 3P, 4 wire or 3 wire for
XVI	I.E. rules pertaining to underground system and service connection.	01	05/05/2025	05/05/2025	I.E. rule pertaining to underground system and service connection
Chapter 05 : Estimation and Costing of Repair and Maintenance of Electrical Equipment and appliances.					
I	D.O.L. starter, small motor, mono block pump, automatic electric iron, table/ceiling fan, ICDDP/CTP Switch, etc.	02	06/05/2025 07/05/2025	06/05/2025 07/05/2025	D.O.L starter, small motor, mono block pump, automatic electric iron, table/ceiling fan, ICDDP/CTP switch etc.
II	Operating Manuals, service manuals and drawing work of the product/equipment.	01	08/05/2025	08/05/2025	Operating Manual, service manual and drawing work of product/equipment

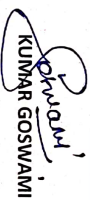
III	Storage of consumables/ spare parts of the equipment.	01	09/05/2025	09/05/2025	Spares of Consumables Spare parts of the eqm
IV	Estimation of repairing cost and overall cost	02	12/05/2025	12/05/2025	Estimation of repairing cost and overall cost
V	Tools used for repairs & maintenance work.	01	13/05/2025	13/05/2025	Tools used for repair and maintenance work
VI	Preparation of cost schedule for repair and maintenance of: - Electric fan. - Automatic electric iron. - Single phase transformer. - FHP motors - Mixer grinder, D.O.L. Starter	03	15/05/2025	15/05/2025	Preparation of cost schedule for repair and maintenance of: - Electric fan, Automatic die iron, single phase transformer, FHP motor, Mixer grinder, D.O.L.

REFERENCE BOOKS

S NO.	TITLE	AUTHOR / PUBLISHERS
1.	Electrical Costing, Estimating and Contracting	S. K. Bhattacharya / TTTI, Chandigarh
2.	Electrical Wiring, Estimating and Costing	S.L. Uppal, G.C. Gang / Khanna Publisher, New Delhi
3.	A Course in Electrical Installation Estimation and Costing	J.B Gupta / S.K. Kataria and Sons
4.	I.E. rules	Bharat Manak Sangralaya, Bhopal
5.	S.O.R	P.W.D., CPWD / Latest edition


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DEPARTMENT: ELECTRICAL ENGINEERING
 SEMESTER: 04TH
 LECTURER NAME: KUMAR GOSWAMI

SUBJECT: A.C. MACHINES
 2024472 (024)
 (THEORY)

S NO.	TOPIC TO TAUGHT	NO. OF LECTURE REQUIRED	EXPECTED DATE OF DELIVERY	ACTUAL DATE OF DELIVERY	TOPIC COVERED	REMARK
Chapter 01 : Alternators						
I	Types and applications.	02	29/01/2025 - 28/01/2025	29/01/2025 - 28/01/2025	Types and applications.	
II	Construction- Salient and cylindrical rotor	02	29/01/2025 - 30/01/2025	29/01/2025 - 30/01/2025	Construction - Salient - and cylindrical rotor	
III	Equivalent circuit and phasor diagram	02	02/02/2025 - 04/02/2025	03/02/2025 - 04/02/2025	Equivalent Circuit and phasor diagram	
IV	Voltage equation	02	05/02/2025 - 06/02/2025	05/02/2025 - 06/02/2025	Voltage equation	
V	Voltage regulation by synchronous impedance method, Open Circuit, Short Circuit characteristics	02	10/02/2025 - 11/02/2025	10/02/2025 - 11/02/2025	Voltage Regulation by Synchronous Impedance	
VI	Synchronization and conditions of synchronization	02	13/02/2025 - 14/02/2025	13/02/2025 - 14/02/2025	Synchronization and conditions of synchronization	
VII	Synchronization of alternator with bus bar/alternator: two bright and one dark lamp method	02	18/02/2025 - 19/02/2025	18/02/2025 - 19/02/2025	Synchronization of alternator with bus bar/alternator: two bright and one dark lamp method	
VIII	Cooling system of alternator	02	20/02/2025 - 21/02/2025	20/02/2025 - 21/02/2025	Cooling system of alternator	
IX	Maintenance of given alternators	02	24/02/2025 - 25/02/2025	24/02/2025 - 25/02/2025	Maintenance of given alternators	
Chapter 02 : Synchronous Motor						
I	Working principle	01	02/03/2025	03/03/2025	Working principle	
II	Starting methods	02	04/03/2025 - 10/03/2025	04/03/2025 - 10/03/2025	Starting methods	
III	Equivalent circuit and phasor diagram	02	11/03/2025	11/03/2025	Equivalent circuit and phasor diagram	
IV	Effect of change in excitation and pf. 'v' and inverted 'v' curves	01	12/03/2025	12/03/2025	Effect of change in excitation and pf. 'v' and inverted 'v' curves	

and inverted V


V	Applications of Synchronous motor - Synchronous condenser and constant speed Hunting and its prevention	01	12/03/2025	13/03/2025	Application of synch. motor - Speed
VI	Hunting and its prevention	01	14/03/2025	14/03/2025	Hunting and its prevention
VII	Maintenance of synchronous motors	01	17/03/2025	17/03/2025	Maintenance of synch. motor
Chapter 03 : Three Phase Induction Motors					
I	Construction, types Squirrel cage - Single, double cage, Wound rotor	02	18/03/2025 19/03/2025	18/03/2025 19/03/2025	Construction, types squirrel cage - single, double cage
II	Working principle, Torque-slip curve, equivalent circuit and phasor diagram	02	20/03/2025 22/03/2025	20/03/2025 22/03/2025	Working principle, Torque-slip curve, equivalent circuit, Torque slip curve
III	Torque equation, Starting, running and condition for the maximum torque (Only expression)	02	24/03/2025	24/03/2025	Torque equation, Starting and condition for the maximum torque
IV	Necessary of starter and types of starters - DOL, Star delta, Autotransformer type and Rotor resistance starter.	02	25/03/2025	25/03/2025	Necessary of starter and types of starters
V	No load and Blocked rotor test, Losses and efficiency	01	27/03/2025	27/03/2025	No load and blocked rotor test
VI	Speed control of squirrel cage and slipring induction motor	01	28/03/2025	28/03/2025	Speed control of squirrel cage and slipring induction motor
VII	Maintenance of different types of induction motors	01	29/03/2025	29/03/2025	Maintenance of different types of induction motors

Chapter 04 : Single Phase Induction Motor

I	Construction, working and types based on starting methods: split phase - Resistance Start, Capacitor start, Capacitor start capacitor run, Shaded pole induction motor	01	31/03/2025	31/03/2025	Construction, working and types based on starting methods
II	Double revolving field theory - equivalent circuit.	01	02/04/2025	02/04/2025	Double revolving field theory
III	Speed/ torque characteristics	01	07/04/2025	07/04/2025	Speed/ torque characteristics
IV	Maintenance of different types of single-phase motors	02	09/04/2025	09/04/2025	Maintenance of different types of single-phase motors

Application of synch. motor - Speed
Hunting and its prevention
Maintenance of synch. motor
Construction, types squirrel cage - single, double cage
Working principle, Torque-slip curve
Torque slip curve
Torque equation, Starting and condition for the maximum torque
Necessary of starter and types of starters
No load and blocked rotor test
Speed control of squirrel cage and slipring induction motor
Maintenance of different types of induction motors
Construction, working and types based on starting methods
Double revolving field theory
Speed/ torque characteristics
Maintenance of different types of single phase motor

Chapter 05 : Special Electrical Machines

<p>Construction, working Speed/ torque characteristics (where ever applicable) and applications of Special electrical machines :</p> <ul style="list-style-type: none"> ➤ AC servo motor ➤ Linear Induction Motor (LIM) ➤ Reluctance motor ➤ Hysteresis motor ➤ Ac series/ Universal motor 		<p>15/04/2025 to 02/05/2025</p>	<p>15/04/2025 14/04/2025 21/04/2025 23/04/2025 25/04/2025 28/04/2025 30/04/2025 02/05/2025</p>	<p>Construction, working speed / torque etc and application of special electrical w/c → AC servo motor → Linear Induction motor → Reluctance motor → Hysteresis motor → Ac series/ Universal motor</p>
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REFERENCE BOOKS

S NO.	TITLE	AUTHOR / PUBLISHERS
1.	Electrical Machinery	Dr. P.S. Bhimbra / Khanna Publications
2.	Electrical Machines (AC & DC Machines)	J.B. Gupta / S. K. Kataria & Sons
3.	Electrical Machines	D.P. Kohari & L.J. Nagrath / Tata McGraw Hill Education
4.	Electric Machines	Asfaq Husain / Dhanpat Rai & Company

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