

-PVT- NSSK Govt. Polytechnic Bhiwapur at Kalol
Lecture Planning (Theory)

Track
Subject
Semester

Electrical Engg.
Electrical Power Transmission & Distribution
 3rd Year Bsc

Semester - 4th
 Starting Date - May 26
 Class Form : EM

Unit-wise Teaching Plan

Ser. No.	No. of Lectures	Chapter / Unit	Details of Contents	Reference Resources	Remarks
1	1-10	Basis of Transmission	Single line diagrams with components of electric supply transmission and distribution systems. Classification of transmission lines: primary and secondary transmission: standard voltage levels used in India. Classification based on voltage: voltage level, length and rated capacity of high voltage line for power transmission.	R1, R2, R3, R4, R5	—
2	11-20	Distribution Systems	Method of composition of electric supply transmission system - 130 kV, 220 kV, 400 kV. Method of composition of electric supply distribution system - 220 V, 400 V, 11 kV, 33 kV.	—	—
3	21-32	Line Parameters & Performance	Line parameters: Concepts of R, L and C of line parameters and types of line. Performance of short transmission line: efficiency, regulation and its derivation, effect of line power factor, receiving diagram for a fixed power factor. Performance of medium line: representation, nominal 'V', nominal 'Y' and π and T equivalent methods.	—	—
4	33-44	EHV AC & HVDC Transmission	Interpretation of advantages and its necessity. Skin effect and proximity effect. Extra High Voltage AC transmission line: necessity, advantages, components, advantages, limitations, applications. Ferranti and Corona effects. HVDC transmission: necessity, components, advantages, limitations, applications. Types of monopolar, bipolar and homopolar lines. FACTS: Basics and types of compensation.	—	—

5	40-50	AC Distribution System	New trends in wireless transmission of electrical power, AC distribution components, classification, mechanisms of AC distribution system, primary and secondary distribution, feeder and distributor, types of distribution schemes: radial, ring and grid. Advantages and disadvantages. Voltage drop, voltage regulation and voltage regulation. Distribution substation: classification, site selection, advantages, disadvantages and applications. Single line diagrams of 11KV/1KV and 33KV/11KV substation with symbols and functions of components.	—	—
6	—	Components of Transmission & Distribution Line	Overhead transmission: properties, types with trade names, sag, Line support: requirements, types, specifications, methods of erection. Line insulation: properties, selection, types, applications, causes of failure, wiring efficiency and methods of improvement. Underground cables: requirements, classification, construction, comparison with overhead lines, cable laying and jointing.	—	—

Signature of Teacher



Signature of HOD (EE)

DEC

Reference Resources

- R1. G.C. Garg – *Installation of Electrical Power & Energy Transfer*, Khanna Publishers
- R2. V.K. Mehta – *Principles of Power System*, B. Chait
- R3. Suresh Gupta & Shrinagar – *A Course in Electrical Power*, Chapter Est
- R4. E.R. Gopal – *A Course in Power Systems*, S.K. Kataria
- R5. D.C. Thompson & A.K. Thomson – *Electrical Technology Vol. III*, S. Chand

Branch: Electrical Engg.

Semester: IV

Subject: ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION LAB/PAID

Session: Jan. - May 20

Teacher: Lath Kumar

Lab Name:

Practical No.	Description of Practical	Reference for Procedures/Works	Lab Status	Actual Date	Sign
1	Prepare a report based on transmission line network is studied	Lab Manual			
2	Collect the information on components of transmission line	Lab Manual			
3	Study the transmission line performance parameters of a given line	Lab Manual			
4	Library internet survey of electrical high voltage line and HVDC line	Lab Manual			
5	Visit to DPT, ET and HVDCDC Distribution Substation and write a report	Lab Manual			
6	Prepare a modelling i. Single line diagram of electric supply system ii. Single line diagram of a three distribution system iii. Short line and medium transmission line iv. Write a report on the same by giving the details of line in Maharashtra State	Lab Manual			
7	Collect different samples of overhead conductors, underground cables, line supports and line insulators	Lab Manual			
8	Prepare a power point presentation i. Extra high voltage AC Transmission line ii. High voltage HV Transmission line iii. Flexible AC Transmission line iv. New trends in electrical transmission of electrical power	Lab Manual			
9	Collect information on i. A.C. Distribution System referred to your institution ii. Draw a layout diagram of HV/MV & MV/LV in your campus/colleges/ institution	Lab Manual			

"PVC" NISK Govt. Polytechnic, Warangal (T.S.R)
Lecture Plan (Theory)

Branch: Electrical Drive

Semester: 4th

Subject: Induction, Synchronous & Special Lines Machines

Duration: Jan 2023 - Jun 2023

Teacher: Dr. Ashwini K. S. S. S.

Class Room: 1, 4

Sr. No.	No. of Lectures	Chapter/Unit Description	Detail of Contents	Reference Books	File
1	12	Three Phase Induction Motor	Working principle, generation of rotating magnetic field, Synchronous speed, slip, speed and slip, Computational details of 3 phase induction motor, Squirrel cage motor, bar motor and slip ring induction motor, Slip quantities, frequency, induced e.m.f, power factor at starting and running condition, Characteristics of torque versus slip (speed), Torque starting full load and maximum with induction motor, From Induction motor is a generalized transformer with phasor diagram, Four quadrant operation, Power flow diagram, Motors, new and types, motor resistance, torque transfer, Max. slip, rotor resistance and soft starters, Speed control methods, motor voltage, pole changing, motor resistance and VVVF, Motor selection for different applications as per the load torque-speed requirements, Maintenance of three phase induction motor.	R1 R2 R3	
2	10	Single phase induction motors	Double flux revolving theory, principle of making these motors self-start, Construction and working, Resistance start induction run, capacitor start induction run, capacitor start capacitor run, shaded pole, repulsion type, motor motor, universal motor, hysteresis motor, Torque-speed characteristics for all of the above motors, Motor selection for different applications as per the load torque-speed requirements, Maintenance of single phase induction motor.		dr
3	15	Three phase Alternators	Principle of working, moving and stationary armatures, Conventional rotors, parts and their functions, rotor constructions, Windings, Single and Double layer, E.M.F. equation of an Alternator with numerical by considering short pitch factor and distribution factor, Alternator loading, Factors affecting the terminal voltage of alternator, Armature		dr

			resistance and leakage reactances, drop Armature reaction at various power factors and synchronous impedance, voltage regulation, brush heating and synchronous impedance methods, Maintenance of alternators	
4	10	Synchronous motors	Principle of working, construction, applications at load angle, Torques, starting, no-load running torque, pull in torque, pull out torque Synchronous motor on load with constant excitation (numerical), effect of excitation at constant load (numerical), V-Curves and Inverted V-Curves, Hunting and Phase swinging, Methods of Starting of Synchronous Motor, Losses in synchronous motors and efficiency (no numerical) Application's notes	40
5	5	Fractional horse power (FHP) Motors	Construction and working, Synchronous Reluctance Motor, Switched Reluctance Motor, B.D.C. Permanent Magnet Synchroni- ous Motor, stepper motor, AC and DC servomotors, Torque speed characteristics of above motors, Applications of above motors	10


 23-01-26
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Teaching Resources:

- R1. Ghatacharya, S. K. Electrical Machines, McGraw Hill Education, New Delhi
- R2. P.S. Bimbhra, Electric Machines, Khanna Book Publishing Co., New Delhi
- R3. <http://www.electrical4u.com>

Branch: Electrical Engg.

Subject: Induction, Synchronous & Special Elect. Machine Lab

Semester: Jan 2005 - Jun 2005

Teacher: Sh. Ajay Kumar

Lab: Elect. Machine Lab

Pract. No.	Description of Practical	Reference for Procedure/ Writeup	Likely Dates	Actual Dates	Sign
1	Identify the different parts along with function and maintenance for the given single phase and three phase induction motor	Lab Manual			
2	Connect and run the three phase squirrel cage induction motor in both directions using the DOL star-delta auto transformer starters (very fast)	Lab Manual			
3	Conduct the No-load and Blocked-rotor tests on given four squirrel cage induction motor and determine the equivalent circuit parameters	Lab Manual			
4	Control the speed of the given three phase squirrel cage slip ring induction motor using the applicable methods (auto transformer, VVT)	Lab Manual			
5	Measure the open circuit voltage ratio of the three phase slip ring induction motor	Lab Manual			
6	Perform the direct loading test on the given three phase alternator and determine the regulation and efficiency	Lab Manual			
7	Determine the regulation and efficiency of the given three phase alternator both DC and AC test/synchronous watt and method	Lab Manual			
8	Conduct the test on field or no load to plot the V curve and inverted V curves (at no-load) of 3 ϕ synchronous motor	Lab Manual			
9	Disassembling and reassembling of single phase motor used for running fan universal motor for oven	Lab Manual			

10. Control the speed and reverse the Lab Manual direction of progress motor
11. Control the speed and reverse the Lab Manual rotation of the AC motor rotor
12. Control the speed and reverse the Lab Manual rotation of the DC motor motor


9/11/2025

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***PVC** NNSK Govt. Polytechnic Bilaspur at Kailali**
Lecture Planning (Theory)

Institute: Electrical Engg.
Subject: Fundamentals of Power Electronics
Instructor: Dr. Nand Mohan

Semester: 2nd
Duration: Jan 27 - May 16
Total Periods: 179

Exhaustive Teaching Plan		Reference	
Unit No.	Lecture Unit Title	Detailed Contents	Reference
Unit-I	1-4 Power Electronic Devices	Introduction to power electronic devices. Power transistor construction, working principle, V-I characteristics and applications. IGBT construction, working principle, V-I characteristics and applications. Introduction to Single-Quadrant Transistor (MOSFET) and a review of semiconductor symbols.	[1], [2], [3], [4], [5]
Unit-II	5-20 Thyristor Family Devices	SCR construction, two-quadrant ratings, working and V-I characteristics. SCR mounting and cooling techniques. Types of thyristors: SCR, LSCR, NCR, GTO, IGT, PUT, HVA and THVA – symbol, construction, operating principle and characteristics. Protection against over-voltage, over-current, protection, snubber and snubber circuit.	[1], [2]
Unit-III	21-34 SCR Turn-On and Turn-Off Methods	SCR turn-on methods: Current triggering, Pulse current triggering, dv/dt triggering, and gate triggering. Turn-off gate circuits: resistance and RC triggering circuits. SCR triggering using IGT and PUT (relaxation oscillator and synchronized SCR circuit). Pulse transformer and opto-coupler based triggering. SCR turn-off methods: Class A series resonant, Class B (ohmic resistance), Class C (compensatory inductor), Class D (inductive commutation), Class E (external pulse) and Class F (zero-current commutation).	[1], [2]
Unit-IV	35-47 Phase Controlled Rectifiers	Phase control: Firing angle and conduction angle. Single-phase half-converter, half-controlled and fully-controlled half-rectifiers with R and RL loads. Circuit diagrams, working, input-output waveforms and expressions for DC output voltage. Effect of freewheeling diode. Bridge-controlled rectifier configurations: full bridge, half bridge with	[1], [2]

			common mode common cathode, SCR in one arm and diode in the other arm	
Unit-V	45-56	Applications of Power Electronics	Applications: Inverter, idler, system, battery charger using SCR, emergency light system, temperature controller, illumination system, fan speed control using TRIAC, fan induction in UPS, UPS offline and online systems, SCR-based AC and DC circuit breakers	R1-R2

Signature of Teacher: 

Signature of HOD (EE): 

R1. Ramanaswari, M. An Introduction to Electronics and their applications, East-West Press Pvt. Ltd. New Delhi, ISBN: 8185532679.

R2. Sengulthi, Ramchandra Kumar and Sengulthi, Krishna Kumar, Thyristors: Theory and Applications, New Age 27 Bhamburda, S.K. Fundamentals of Power Electronics, Vikas Publishing House Pvt. Ltd. New Delhi, ISBN: 978-8122908533.

R3. Jain R. Ashok, Power Electronics and its Applications, Prentice International Publishing (India) Pvt. Ltd. Mumbai, ISBN: 978-8187972225.

R4. Rashid, Muhammad, Power Electronic Converters: Devices and Applications, Prentice Education India, New Delhi, ISBN: 978-0132125803.

R5. Singh, M. D. and Kharbanda, R. D., Power Electronics, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2008 ISBN: 9780070818444.

PRACTICAL PLANNING & COVERAGE

Branch: Electrical Engineering

Semester: 4th

Lab Name: Electronics Lab

Subject: Fundamentals of Power Electronics

Session: January 2021 – May 2021

Teacher (r. Name): Mr. Nitesh Mishra

List of Experiments

Sr. No.	Name of Experiment	Reference
1	To test the proper functioning of TRIAC and determine its break-over voltage.	Lab Manual
2	To determine holding current and latching current of SCR using V-I characteristics.	Lab Manual
3	To study the effect of variation of R and C in R and RC triggering circuits on the firing angle of SCR.	Lab Manual
4	To study the effect of variation of R and C in L/T triggering technique.	Lab Manual
5	To perform and study the operation of Class A, B and C, common emitter circuits.	Lab Manual
6	To perform and study the operation of Class D, E and F power-off circuits.	Lab Manual
7	To observe output waveforms of half-wave controlled rectifier with resistive load using CRO and determine load voltage.	Lab Manual
8	To draw and analyze output waveforms of full-wave controlled rectifier with R load, RL load and free-wheeling diode, and determine load voltage.	Lab Manual
9	To determine firing angle using DIAC and TRIAC phase-controlled circuit and study output power under different loads (lamp, motor, heater).	Lab Manual
10	To simulate firing angle control using MATLAB software.	Lab Manual
11	To test the performance of pure VVFS and ITC.	Lab Manual
12	To build/construct burglar alarm system, emergency light system, speed control system and temperature control system.	Lab Manual

Signature of Teacher:

Signature of HOD (r. Name):

**"FAC" MOK Govt. Polytechnic College at Kabi
Lecture Planning (Theory)**

Branch: Electrical Engg.

Subject: ELECTRICAL ESTIMATION AND COSTING

Teacher: Jyoti Bhat

Semester: 4th

Session: Jan-Mar, 20

Class Room: 1A

Sl. No. of No. Lectures	Chapter/Unit Description	Detail of Contents	Reference Bibliography	Remarks
1.	1-10	Electric Installation and Safety	B1.B2, B1.B3/B1.B5	
		Scope and features of National Electrical Code (NEC) Types of electrical installations Fundamental principles for electrical installation Permit to work, safety instructions and safety practices, features of erecting and working.		
2.	11-18	Estimation and Costing	-10-	
		Meaning and purpose of : rough estimate, detailed estimate, supplementary estimate, annual maintenance estimate and revised estimate Factors to be considered while preparation of detailed estimate and economical execution of work Contracts, Contents of contracts, types of contracts, comparison, role of contractor Tendering and Submission: Type of tender, tender notice, preparation of tender document, and method of opening of tender; Questions, installation forms, comparison between tender and execution; Commercial statement, formal competitive statement, Order form, placing of purchasing order Principles of execution of works, planning, organizing and completion of work, filling of work		
3.	19-20	Non- Industrial Installations	-10-	
		Types of Non-industrial installations—Office buildings, shopping and commercial centre, residential installations, Electric service and supply Design consideration of electrical installation in commercial buildings. Design procedure of installation steps involved in detail, Estimation and costing of self working of commercial installation. Design electrical installation scheme at commercial centre. Inspection, inspection and testing of installation as per NEC.		
4.	21-23	Industrial Installation	-10-	
		Classification of industrial buildings Classification based on power consumption, Drawing of wiring diagram and single-line diagram for single phase and three phase Motor Design consideration in industrial installation Design procedure of installation detailed steps. Design electrical installation scheme of (any/your) industrial unit. Presentation		

			of material estimate and detailed connection installation and estimation of agricultural pump and line all.	
1.	4-49	Public Lighting Installation	Classification of various installation streetlight/ public lighting installation Street light pole structure, location of equipments, meter and its street light installation, Cables, recommended type and sizes of cable, layout of street light installation. Design, estimation and costing of street light. Preparation of tender and abstracts.	49
2.	50-57	Electrification Lines and LT Substation	Introduction to overhead and underground distribution line. Materials used for distribution line LT and LV Cables used for distribution line, factors determining selection of LT/ LV poles Cables, cable laying and cable termination method according to IS design, estimation and costing of LT LV overhead line and underground cabling. Types of 11 KV Distribution substation their line design, location of load, load factor, diversity factor and determination of rating of distribution Transformer design, estimation and costing of switch and isolator 11 KV substation	

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Reference Sources

- R1. Jain, L.K.; Dr. S. K. Kataria New Age International Publisher First, Edition 2010, Electrical Design Estimation and Costing ISBN: 978-81-224-6360-3
- R2. Allagumani, N. S. Distribution, Tata Mc-Graw Hill Publishing Co. Ltd, Electrical Estimating and Costing, ISBN IS: 9780074624765.
- R3. Gupta, Sarita Navi Deep Singh, Marpal Sol and Sam, Electrical Estimating and Costing, ISBN IS: 1234567150599
- R4. Gupta, J.S. L.K. International New Edition Edition, 4 Edition in Electrical Installation Estimating and Costing ISBN IS: 813024229113: 978-9386142790.
- R5. Bureau of Indian Standard, IS: 152-1986, Code of Practice for Electrical Wiring Installation
- R6. Bureau of Indian Standard, SP-12-2013, National Electrical Code 2013

**PV4 * NSQ Govt. Polytechnic Bhopal at Kailash
Practical Planning & Coverage**

Branch : Electrical Engg.

Subject : ELECTRICAL ESTIMATION AND CONTRACTING

Teacher : Dr. B. K. Sahu

Semester : IV

Session : Jan 23 - May 23

Lab Name :

Practical No.	Description of Practical	Reference for Procedures/Work up	Likely Dates	Actual Dates	Sign
1	Prepare a tender notice for purchasing a transformer of 200 KVA for commercial installation.	Lab Manual			
2	Prepare a quotation for purchasing different electrical material required.	Lab Manual			
3	Prepare a comparison statement for above material. Prepare purchase order for the same.	Lab Manual			
4	Design starting, controlling and coding of ball / Ceiling Fan motor / commercial installation. Prepare report and draw sheet.	Lab Manual			
5	Design electrical installation scheme for any one factory / small industrial unit. Draw detailed wiring diagram. Prepare material schedule and detailed estimate. Prepare report and draw sheet.	Lab Manual			
6	Estimate with a proposal of the electrical installation of street light scheme for small premises after designing.	Lab Manual			
7	Estimate with a proposal of the L.T. line installation. Prepare report and draw sheet.	Lab Manual			
8	Estimate with a proposal of the 500 KVA, 11/0.420 KV substation and prepare a report.	Lab Manual			

Signature of Teacher with Date:

Signature of HOD/DEET / etc.

