

GOVT. POLYTECHNIC KALAHANDI		
LESSON PLAN:CONTROL SYSTEM ENGINEERING SUMMER 2025		
Discipline: ELECTRICAL	Semester:SUMMER 2025	Name of the teaching faculty: LIPSA PANIGRAHI
Subject: Control System Engineering	No of days/per week class-5/week	Semester From Date: <u>04/02/2025</u> To Date: <u>18/04/2026</u>
Toal Class allotted:75		No of weeks: 15 weeks
Week	period	Topic
1st	1st	1.FUNDAMENTALS OF CONTROL SYSTEM 1.1 Classification of Control system 1.2 Open loop system & Closed loop system and its comparison
	2nd	1.3 Effects of Feed back
	3rd	1.4 Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)
	4th	1.5 Servomechanism
	5th	1.5 Servomechanism
2nd	1st	TUTORIAL Chapter 1
	2nd	2.MATHEMATICAL MODEL OF A SYSTEM 2.1 Transfer Function & Impulse response
	3rd	2.2 Properties, Advantages & Disadvantages of Transfer Function
	4th	2.3 Poles & Zeroes of transfer Function
	5th	2.4 Simple problems of transfer function of network
3rd	1st	2.5 Mathematical modeling of Electrical Systems(R, L, C, Analogous
	2nd	TUTORIAL Chapter 2
	3rd	3.CONTROL SYSTEM COMPONENTS 3.1 Components of Control System
	4th	3.2 Gyroscope, Synchros
	5th	3.2 Tachometer
4th	1st	3.2 DC servomotors, Ac Servomotors.
	2nd	TUTORIAL Chapter 3
	3rd	4.BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1 Definition: Basic Elements of Block Diagram
	4th	4.2 Canonical Form of Closed loop Systems
	5th	4.3 Rules for Block diagram reduction
5th	1st	4.4 Procedure for of Reduction of Block Diagram
	2nd	4.5Simple Problem for equivalent transfer function
	3rd	4.6 Basic Definition in Signal Flow Graph & properties
	4th	4.7Construction of Signal Flow graph from Block diagram
	5th	4.8 Mason's Gain formula
6th	1st	4.9 Simple problems in Signal flow graph for network
	2nd	TUTORIAL Chapter 4
	3rd	5.TIME RESPONSE ANALYSIS 5.1 Time response of control system. 5.2 Standard Test signal.
	4th	5.2 Step signal, Ramp Signal
	5th	5.2 Parabolic Signal, Impulse Signal
7th	1st	5.3 Time Response of first order system with Unit step response
	2nd	5.3 Time Response of first order system Unit impulse response.
	3rd	5.4 Time response of second order system to the unit step input.
	4th	5.4 Time response specification.
	5th	5.4 Derivation of expression for rise time, peak time, peak overshoot,

8th	1st	Numerical problems of time response analysis.
	2nd	5.4 Steady state error and error constants
	3rd	5.5 Types of control system.[Steady state errors in Type-0, Type-1,
	4th	5.6 Effect of adding poles and zero to transfer function.
	5th	5.7 Response with P, PI controller.
9th	1st	5.7 Response with PD and PID controller.
	2nd	TUTORIAL Chapter 5
	3rd	6.ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE
	4th	6.1 Root locus concept.
	5th	6.3 Basic Rules for construction of root locus
10th	1st	-do-
	2nd	6.2 Construction of root loci
	3rd	-do-
	4th	6.4 Effect of adding poles and zeros to $G(s)$ and $H(s)$.
	5th	TUTORIAL Chapter 6
11th	1st	7.FREQUENCY RESPONSE ANALYSIS
	2nd	7.1 Correlation between time response and frequency response.
	3rd	-do-
	4th	7.2 Polar plots.
	5th	7.3 Basic rules of construction of Bode plots.
12th	1st	-do-
	2nd	-do-
	3rd	7.3 Bode plots
	4th	7.4 All pass and minimum phase system
	5th	-do-
13 th	1st	7.5 Computation of Gain margin and phase margin.
	2nd	-do-
	3rd	7.6 Log magnitude versus phase plot.
	4th	-do-
	5th	7.7 Closed loop frequency response.
14 th	1st	TUTORIAL Chapter 7
	2nd	8.NYQUIST PLOT
	3rd	8.1 Principle of argument
	4th	8.2 Nyquist stability criterion.
	5th	-do-
15 th	1st	8.3 Nyquist stability criterion applied to inverse polar plot
	2nd	8.4 Effect of addition of poles and zeros to $G(s)$ $H(s)$ on the shape of
	3rd	-do-
	4th	8.5 Assessment of relative stability.
	5th	8.6 Constant M circle and N circle
		8.7 Nicholas chart
		Class Test

Lipsa pantigrahe
22/12/2025
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D/c H.O.D(Electrical Engg.)

LESSON PLAN

GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

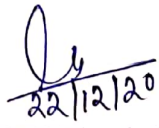
Faculty Name: KAMBUDEEP BAG BRANCH: ELECTRICAL SEM: 6TH SESSION: 2025-26(S)

SUBJECT: ELECTRICAL INSTALLATION AND ESTIMATING	No. of days/ week Class allotted: 5 Total Periods: 75	w.e.f. 22-12-2025 to 18-04-2026
Week	Class Day	Theory
1st	1st	1. INDIAN ELECTRICITY RULES 1.1 Definitions, Ampere, Apparatus, Accessible, Bare, cable, circuit, circuit breaker, conductor voltage (low, medium, high, EH), live, dead, cut-out, conduit, system, danger, Installation, earthing system, span, volt, switch gear, etc.
	2nd	1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45, 46.
	3rd	1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70.
	4th	1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91
	5th	Tutorial
2nd	1st	2. ELECTRICAL INSTALLATIONS 2. 1 Electrical installations, domestics, industrial, Wiring System, Internal distribution of Electrical Energy. Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection. Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	Tutorial
3rd	1st	2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings, lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units. Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing.
	2nd	-DO-
	3rd	-DO-
	4th	2. 3 LIGHTING SCHEME: Aspects of good lighting services. Types of lighting schemes, design of lighting schemes, factory lighting, public lighting installations, street lighting,
	5th	Tutorial
4th	1st	general rules for wiring, determination of number of points (light, fan, socket, outlets), determination of total load, determination of Number of sub-circuits.
	2nd	-DO-
	3rd	-DO-
	4th	-DO-
	5th	Tutorial
5th	1st	3. INTERNAL WIRING 3 .1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping, metal sheathed wiring, conduit wiring, their advantage and disadvantages comparison and applications.

	2 nd	-DO-
	3 rd	-DO-
	4 th	3 .2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m ² with given light, fan & plug points.
	5 th	Tutorial
6 th	1 st	3 .2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m ² with given light, fan & plug points.
	2 nd	-DO-
	3 rd	3 .3 Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m ² with given light, fan & plug points.
	4 th	-DO-
	5 th	Tutorial
7 th	1 st	3 .4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen & verandah within 80m ² with given light, fan & plug points.
	2 nd	-DO-
	3 rd	3 .5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m ² and load within 10 KW.
	4 th	-DO-
	5 th	Tutorial
8 th	1 st	4.OVER HEAD INSTALLATION 4.1. Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.
	2 nd	-DO-
	3 rd	-DO-
	4 th	4.2. Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.
	5 th	Tutorial
9 th	1 st	4.2. Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.
	2 nd	-DO-
	3 rd	4.3. Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.
	4 th	-DO-
	5 th	Tutorial
10 th	1 st	4.4. Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consider action using ACSR.

	2 nd	-DO-
	3 rd	-DO-
	4 th	-DO-
	5 th	Tutorial
11 th	1 st	5.OVER HEAD SERVICE LINES 5. 1 Components of service lines, service line (cables and conductors), bearer wire, lacing rod. Ariel fuse, service support, energy box and meters etc.
	2 nd	-DO-
	3 rd	5. 2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building.
	4 th	-DO-
	5 th	Tutorial
12 th	1 st	5. 3 Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter.
	2 nd	-DO-
	3 rd	5. 4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire.
	4 th	-DO-
	5 th	Tutorial
13 th	1 st	5. 5 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined.
	2 nd	-DO-
	3 rd	-DO-
	4 th	6.ESTIMATING FOR DISTRIBUTION SUBSTATIONS 6. 1 Prepare one materials estimate for following types of transformer substations.
	5 th	Tutorial
14 th	1 st	6. 1 Prepare one materials estimate for following types of transformer substations.
	2 nd	6.1.1 Pole mounted substation.
	3 rd	-DO-
	4 th	6.1.2 Plinth Mounted substation.
	5 th	Tutorial
15 th	1 st	6.1.2 Plinth Mounted substation.
	2 nd	-DO-
	3 rd	-DO-
	4 th	-DO-
	5 th	Tutorial


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 22/12/2025
 P/c HOD(Electrical)

LESSON PLAN

GOVT POLYTECHNIC, KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND BRANCH: ELECTRICAL SEM: 6th SESSION: 2025-26(S)

SUBJECT: Electrical Work Shop	No. of days/ week Class allotted: 6 Total Periods: 90	w.e.f. 22.12.2025 to 18.04.2026
Week	Class Period	Theory
1 st	1 st	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminum PVC, VIR & Weather proof (WP) wire and prepare Britannia T- joint and Married joint.
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
2 nd	1 st	-do-
	2 nd	
	3 rd	
	4 th	2. Cutting copper and aluminum cable and crimping lug to them from 2.5mm ² to 6 mm ² cross section.
	5 th	
	6 th	
3 rd	1 st	-do-
	2 nd	
	3 rd	
	4 th	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case-prepare lux table .
	5 th	
	6 th	
4 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
5 th	1 st	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity).
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
6 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	5. Erection of residential building wiring by CTS and conduit wiring system using main two points and test installation by test lamp method and a meggar.
	5 th	
	6 th	
7 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	

LESSON PLAN
GOVT POLYTECHNIC, KALAHANDI, BHAWANIPATNA

Faculty Name: SATYAPRAKASH OJHA **BRANCH:** ELECTRICAL **SEM:** 6TH **SESSION:**2025-26(S)

SUBJECT: Electrical Work Shop	No. of days/ week Class allotted: 6 Total Periods: 90	w.e.f. 22.12.2025 to 18.04.2026
Week	Class Period	Theory
1st	1st	1. Identification of single core (SC), twin core (TC), three cores (3c), four cores (4c); copper and aluminum PVC, VIR & Weather proof (WP) wire and prepare Britannia T- joint and Married joint.
	2nd	
	3rd	
	4th	-do-
	5th	
	6th	
2nd	1st	-do-
	2nd	
	3rd	
	4th	2. Cutting copper and aluminum cable and crimping lug to them from 2.5mm ² to 6 mm ² cross section.
	5th	
	6th	
3rd	1st	-do-
	2nd	
	3rd	
	4th	3. Connection and testing of fluorescent tube light, high pressure M.V. lamp, sodium vapor lamp, M.H lamp, CFL and latest model lamps – measure inductance, Lux/ lumens (intensity of illumination) in each case-prepare lux table .
	5th	
	6th	
4th	1st	-do-
	2nd	
	3rd	
	4th	-do-
	5th	
	6th	
5th	1st	4. Study battery charger and make charging of lead acid battery (record charging voltage, current and specific gravity).
	2nd	
	3rd	
	4th	-do-
	5th	
	6th	
6th	1st	-do-
	2nd	
	3rd	
	4th	5. Erection of residential building wiring by CTS and conduit wiring system using main two points and test installation by test lamp method and a meggar.
	5th	
	6th	
7th	1st	-do-
	2nd	
	3rd	
	4th	-do-
	5th	
	6th	

8 th	1 st	6. Fault finding & repairing of Ceiling Fan – prepare an inventory list of parts.
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
9 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	7. Find out fault of D.C. generator, repair and test it to run.
	5 th	
	6 th	
10 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	8. Find out fault of D.C. motor starters and A.C motor starter – prepare an inventory list of parts used in different starters.
	5 th	
	6 th	
11 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	9. Dismantle, over haul and assemble a single phase induction motor. Test and run it. – prepare an inventory list.
	5 th	
	6 th	
12 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
13 th	1 st	10. Dismantle over haul and assemble a three phase squirrel cage and phase wound motor. Test and run them.
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	
14 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	11. Overhaul a single phase and 3-phase variac.
	5 th	
	6 th	
15 th	1 st	-do-
	2 nd	
	3 rd	
	4 th	-do-
	5 th	
	6 th	

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22/12/2025
P/c HOD (Electrical Dept)



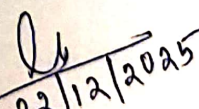
LESSON PLAN
GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: Kambhudeep Bag **BRANCH:** ELECTRICAL **SEM:** 4TH **SESSION:** 2025-26(W)

SUBJECT: LINEAR CONTROL SYSTEMS LAB	No. of days/ week Class allotted: 4 Total Periods: 60	w.e.f.22-12-2025to18-04-2026
Week	Class Period	Theory
1st	1st 2nd	To study speed Torque characteristics of • AC servo motor • DC servomotor.
	3rd 4th	To study speed Torque characteristics of • AC servo motor • DC servomotor.
2nd	1st 2nd	To study and demonstrate • Simple motor driven closed loop DC position control system. • Simple closed loop speed control system.
	3rd 4th	To study and demonstrate • Simple motor driven closed loop DC position control system. • Simple closed loop speed control system.
3rd	1st 2nd	To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
	3rd 4th	To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
4th	1st 2nd	To study behavior of 1st order, 2nd order type 0, type 1 system. • Step, ramp and Impulse response of first order systems. • Step, ramp and Impulse response of second order
	3rd 4th	To study behavior of 1st order, 2nd order type 0, type 1 system. • Step, ramp and Impulse response of first order systems. • Step, ramp and Impulse response of second order
5th	1st 2nd	To study • DC potentiometer as error detector. • Synchro transmitter/receiver
	3rd 4th	To study • DC potentiometer as error detector. • Synchro transmitter/receiver
6th	1st 2nd	To study temperature control system
	3rd 4th	To study temperature control system
7th	1st 2nd	Different Toolboxes in software,

	3 rd 4 th	Different Toolboxes in software,
8 th	1 st 2 nd	Introduction to Control Systems Toolbox
	3 rd 4 th	Introduction to Control Systems Toolbox
9 th	1 st 2 nd	Determine transpose, inverse values of given matrix
	3 rd 4 th	Determine transpose, inverse values of given matrix
10 th	1 st 2 nd	Plot the pole-zero configuration in s-plane for the given transfer function.
	3 rd 4 th	Plot the pole-zero configuration in s-plane for the given transfer function.
11 th	1 st 2 nd	Plot unit step response of given transfer function and find peak overshoot, peak time.
	3 rd 4 th	Plot unit step response of given transfer function and find peak overshoot, peak time.
12 th	1 st 2 nd	Plot unit step response and to find rise time and delay time.
	3 rd 4 th	Plot unit step response and to find rise time and delay time.
13 th	1 st 2 nd	Plot locus of given transfer function, locate closed loop poles for different values of k.
	3 rd 4 th	Plot locus of given transfer function, locate closed loop poles for different values of k.
14 th	1 st 2 nd	Plot root locus of given transfer function and to find out S, Wd, Wn at given root & to discuss stability
	3 rd 4 th	Plot root locus of given transfer function and to find out S, Wd, Wn at given root & to discuss stability
15 th	1 st 2 nd	Plot Nyquist plot and identify stability of a system.
	3 rd 4 th	Plot Bode plot and identify stability of a system


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LESSON PLAN

GOVT POLYTECHNIC, KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND BRANCH: ELECTRICAL SEM: 6th SESSION: 2025-26(S)

SUBJECT: Project phase ii No. of days/ week Class allotted: 8 w.e.f. 22.12.2025 to 18.04.2026
Total Periods: 120

Week	Class Day(no. of periods)	Theory
1 st	1 st (3P)	1. Selection of project assignment & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
2 nd	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	2. Planning and execution of considerations & project work
3 rd	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
4 th	1 st (3P)	-do-
	2 nd (2P)	3. Quality of performance & project work
	3 rd (3P)	-do-
5 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
6 th	1 st (3P)	4. Providing solution of the problems or production of final product & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
7 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	5. Sense of responsibility & project work
8 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
9 th	1 st (3P)	-do-
	2 nd (2P)	6. Self-expression/ communication/ Presentation skills & project work
	3 rd (3P)	-do-
10 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
11 th	1 st (3P)	7. Interpersonal skills/human relations & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
12 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	8. Report writing skills & project work
13 th	1 st (3P)	-do-

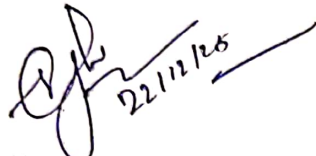
LESSON PLAN

GOVT POLYTECHNIC, KALAHANDI, BHAWANIPATNA

Faculty Name: SATYPRAKASH OJHA **BRANCH:** ELECTRICAL **SEM:** 6TH **SESSION:**2025-26(S)

SUBJECT: Project phase ii	No. of days/ week Class allotted: 8 Total Periods: 120	w.e.f. 22.12.2025 to 18.04.2026
Week	Class Day(no of periods)	Theory
1 st	1 st (3P)	1. Selection of project assignment & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
2 nd	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	2. Planning and execution of considerations & project work
3 rd	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
4 th	1 st (3P)	-do-
	2 nd (2P)	3. Quality of performance & project work
	3 rd (3P)	-do-
5 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
6 th	1 st (3P)	4. Providing solution of the problems or production of final product & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
7 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	5. Sense of responsibility & project work
8 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
9 th	1 st (3P)	-do-
	2 nd (2P)	6. Self-expression/ communication/ Presentation skills & project work
	3 rd (3P)	-do-
10 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-
11 th	1 st (3P)	7. Interpersonal skills/human relations & project work
	2 nd (2P)	-do-
	3 rd (3P)	-do-
12 th	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	8. Report writing skills & project work
13 th	1 st (3P)	-do-

14 th	2 nd (2P)	-do-
	3 rd (3P)	-do-
	1 st (3P)	-do-
15 th	2 nd (2P)	9. Viva voce
	3 rd (3P)	-do-
	1 st (3P)	-do-
	2 nd (2P)	-do-
	3 rd (3P)	-do-


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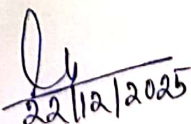
GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

Faculty Name: SATYAPRAKASH OJHA BRANCH: ELECTRICAL SEM: 6TH SESSION: 2025-26(S)

SUBJECT: RES	No. of days/ week Class allotted: 5 Total Periods: 75	w.e.f. 22.12.2025 to 18.04.2026
Week	Class Day	Theory
1 st	1 st	1.Introduction to Renewable energy:
	2 nd	1.1. Environmental consequences of fossil fuel use.
	3 rd	1.2. Importance of renewable sources of energy.
	4 th	1.3. Sustainable Design and development.
	5 th	1.4 Types of RE sources. 1.5. Limitations of RE sources.
2 nd	1 st	1.6. Present Indian and international energy scenario of conventional and RE sources
	2 nd	TUTORIAL Chapter 1
	3 rd	-do-
	4 th	-do-
	5 th	2.Solar Energy:
3 rd	1 st	2.1. Solar photovoltaic system-Operating principle.
	2 nd	2.2. Photovoltaic cell concepts
	3 rd	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	4 th	-DO-
	5 th	-DO-
4 th	1 st	2.3. Classification of energy Sources.
	2 nd	2.4. Extra-terrestrial and terrestrial Radiation.
	3 rd	-DO-
	4 th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	5 th	-DO-
5 th	1 st	2.6. Solar collectors, Types and performance characteristics,
	2 nd	2.7. Applications: Photovoltaic - battery charger
	3 rd	domestic lighting
	4 th	street lighting
	5 th	water pumping
6 th	1 st	solar cooker, Solar Pond
	2 nd	TUTORIAL Chapter 2
	3 rd	-do-
	4 th	3.Wind Energy:
	5 th	3.1. Introduction to Wind energy.
7 th	1 st	3.2. Wind energy conversion.
	2 nd	3.3. Types of wind turbines
	3 rd	3.4. Aerodynamics of wind rotors.
	4 th	3.5. Wind turbine control systems; conversion to electrical power:
	5 th	3.6. Induction and synchronous generators.
8 th	1 st	3.7. Grid connected and self excited induction generator operation.
	2 nd	-DO-
		3.8. Constant voltage and constant frequency generation with power electronic control.

	2 nd	3.9. Single and double output systems.
	3 rd	3.10. Characteristics of wind power plant.
	4 th	TUTORIAL Chapter 3
	5 th	-do-
	1 st	-do-
9 th	2 nd	CLASS TEST
	3 rd	4. Biomass Power: 4.1. Energy from Biomass 4.2. Biomass as Renewable Energy Source
	4 th	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	5 th	-DO-
	1 st	4.4. Combustion and fermentation.
10 th	2 nd	-DO-
	3 rd	4.5. Anaerobic digestion.
	4 th	4.6. Types of biogas digester
	5 th	4.7. Wood gassifier.
	1 st	4.8. Pyrolysis,.
11 th	2 nd	4.9. Applications: Bio gas, Bio diesel
	3 rd	-DO-
	4 th	TUTORIAL Chapter 4
	5 th	-do-
	1 st	-do-
12 th	2 nd	5. Other Energy Sources 5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems
	3 rd	-DO-
	4 th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5 th	-DO-
	1 st	5.3. Geothermal Energy – Classification.
13 th	2 nd	-DO-
	3 rd	5.4. Hybrid Energy Systems.
	4 th	-DO-
	5 th	-DO-
	1 st	5.5. Need for Hybrid Systems
14 th	2 nd	-DO-
	3 rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4 th	-DO-
	5 th	-DO-
	1 st	-DO-
15 th	2 nd	TUTORIAL Chapter 5
	3 rd	-do-
	4 th	-do-
	5 th	Doubt clearing Session


22/12/25
Sign of Faculty


22/12/2025
P/c HOD (Electrical Dept)

LESSON PLAN
GOVT POLYTECHNIC KALAHANDI, BHAWANIPATNA

FACULTY NAME: BHUBANTA KAND **BRANCH: ELECTRICAL** **SEM: 6th** **SESSION: 2025-26(S)**

SUBJECT: SGPD	No. of days/ week Class allotted: 5 Total Periods: 75	w.e.f. 22.12.25 to 18.04.26
Week	Class Day	Theory
1st	1st	1.INTRODUCTION TO SWITCHGEAR 1.1 Essential Features of switchgear. 1.2 Switchgear Equipment.
	2nd	1.3 Bus-Bar Arrangement.
	3rd	-do-
	4th	1.4 Switchgear Accommodation. 1.5 Short Circuit.
	5th	1.6 Short Circuit Current
2nd	1st	1.7 Faults in a power system.
	2nd	TUTORIAL CHAPTER 1
	3rd	2. FAULT CALCULATION 2.1 Symmetrical faults on 3-phase system.
	4th	2.2 Limitation of fault current. 2.3 Percentage Reactance.
	5th	2.4 Percentage Reactance and Base KVA. 2.5 Short – circuit KVA.
3rd	1st	2.6 Reactor control of short circuit currents. 2.7 Location of reactors.
	2nd	-do-
	3rd	2.8 Steps for symmetrical Fault calculations.
	4th	2.9 Solve numerical problems on symmetrical fault.
	5th	-do-
4th	1st	-do-
	2nd	-do-
	3rd	TUTORIAL CHAPTER 2
	4th	3. FUSES 3.1 Desirable characteristics of fuse element.
	5th	3.2 Fuse Element materials.
5th	1st	3.3 Types of Fuses and important terms used for fuses.
	2nd	-do-
	3rd	3.4 Low and High voltage fuses.
	4th	3.5 Current carrying capacity of fuse element. 3.6 Difference Between a Fuse and Circuit Breaker.
	5th	TUTORIAL CHAPTER 3
6th	1st	CLASS TEST I
	2nd	4.CIRCUIT BREAKERS
	3rd	4.1 Definition and principle of Circuit Breaker. 4.2 Arc phenomenon and principle of Arc Extinction.
	4th	4.3 Methods of Arc Extinction.
	5th	4.4 Definitions of Arc voltage, Re-striking voltage and Recovery voltage.
	5th	4.5 Classification of circuit Breakers. 4.6 Oil circuit Breaker and its classification.
7th	1st	4.7 Plain brake oil circuit breaker. 4.8 Arc control oil circuit breaker.
	2nd	4.11 Air-Blast circuit breaker and its classification.

8 th	3 rd	4.12 Sulphur Hexa-fluoride (SF6) circuit breaker.
	4 th	4.13 Vacuum circuit breakers.
	5 th	4.14 Switchgear component.
	1 st	4.15 Problems of circuit interruption
	2 nd	4.16 Resistance switching. 4.17 Circuit Breaker Rating.
9 th	3 rd	TUTORIAL CHAPTER 4
	4 th	5. PROTECTIVE RELAYS 5.1 Definition of Protective Relay. 5.2 Fundamental requirement of protective relay.
	5 th	5.3 Basic Relay operation 5.3.1. Electromagnetic Attraction type 5.3.2. Induction type
	1 st	5.4 Definition of following important terms 5.5 Definition of following important terms. 5.5.1. Pick-up current. 5.5.2. Current setting. 5.5.3. Plug setting Multiplier. 5.5.4. Time setting Multiplier.
	2 nd	5.6 Classification of functional relays
10 th	3 rd	5.7 Induction type over current relay (Non-directional)
	4 th	5.8 Induction type directional power relay.
	5 th	5.9 Induction type directional over current relay.
	1 st	5.10 Differential relay 5.10.1. Current differential relay
	2 nd	5.10.2. Voltage balance differential relay. 5.11 Types of protection
11 th	3 rd	TUTORIAL CHAPTER 5
	4 th	6. PROTECTION OF ELECTRICAL POWER EQUIPMENT AND LINES 6.1 Protection of alternator. 6.2 Differential protection of alternators.
	5 th	6.3 Balanced earth fault protection.
	1 st	6.4 Protection systems for transformer. 6.5 Buchholz relay.
	2 nd	6.6 Protection of Bus bar.
12 th	3 rd	6.7 Protection of Transmission line. 6.8 Different pilot wire protection (Merz-price voltage Balance system)
	4 th	6.9 Explain protection of feeder by over current and earth fault relay.
	5 th	TUTORIAL CHAPTER 6
	1 st	7. PROTECTION AGAINST OVER VOLTAGE AND LIGHTING 7.1. Voltage surge and causes of over voltage.
	2 nd	7.2. Internal cause of over voltage. 7.3. External cause of over voltage (lighting)
12 th	3 rd	7.4. Mechanism of lightning discharge.
	4 th	7.5. Types of lightning strokes.
	5 th	7.6. Harmful effect of lightning.
	1 st	7.7. Lightning arresters and Type of lightning Arresters. 7.7.1. Rod-gap lightning arrester. 7.7.2. Horn-gap arrester. 7.7.3. Valve type arrester.
	2 nd	-do-

F	1 st	7.8. Surge Absorber
	2 nd	TUTORIAL CHAPTER 7
	3 rd	8. STATIC RELAY:
	4 th	8. 1 Advantage of static relay.
	5 th	8. 2 Instantaneous over current relay.
14 th	1 st	-do-
	2 nd	8. 3 Principle of IDMT relay.
	3 rd	-do-
	4 th	-do-
	5 th	TUTORIAL CHAPTER 8
15 th	1 st	DOUBT CLEARING CLASS
	2 nd	-do-
	3 rd	-do-
	4 th	-do-
	5 th	-do-
		CLASS TEST II

SIGN. FACULTY

HOD(Electrical)