

ACADEMIC LESSON PLAN OF SUMMER 2026

Discipline: Electrical	Semester: 6 th (sec-B)	Name of the Teaching Faculty: Preeti Pragyan & Sanjeeb Dalai
Subject: Renewable Energy (TH-4)	No. of days/per week class allotted: 4p/week Tutorial: 1p/week	Semester From: 22.12.2025 to 18.04.2026
Week	Class/week	Theory Topics
1 st	1 st	1.1. Environmental consequences of fossil fuel use.
	2 nd	1.2. Importance of renewable sources of energy.
	3 rd	1.3 Sustainable Design and development.
	4 th	1.4. Types of RE sources.
	5 th	Tutorial
2 nd	1 st	1.5. Limitations of RE sources
	2 nd	1.6. Present Indian and international energy scenario of conventional and RE sources
	3 rd	2.1. Solar photovoltaic system-Operating principle.
	4 th	2.2. Photovoltaic cell concepts
	5 th	Tutorial
3 rd	1 st	2.2.1. Cell, module, array, Series and parallel connections.
	2 nd	2.3. Classification of energy Sources.
	3 rd	2.4. Extra-terrestrial and terrestrial Radiation.
	4 th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	5 th	Tutorial
4 th	1 st	2.6. Solar collectors, Types, and performance characteristics,
	2 nd	2.6. Solar collectors, Types, and performance characteristics,
	3 rd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting.
	4 th	2.7. Applications: Photovoltaic - water pumping, solar cooker, Solar Pond.
	5 th	Tutorial
5 th	1 st	3.1. Introduction to Wind energy.
	2 nd	3.2. Wind energy conversion.
	3 rd	3.3. Types of wind turbines
	4 th	3.3. Types of wind turbines
	5 th	Tutorial
6 th	1 st	3.4. Aerodynamics of wind rotors.
	2 nd	3.5. Wind turbine control systems; conversion to electrical power:
	3 rd	3.6. Induction and synchronous generators.
	4 th	3.7. Grid connected and self-excited induction generator operation.
	5 th	Tutorial
7 th	1 st	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	4.1. Energy from Biomass.
	5 th	Tutorial
8 th	1 st	4.2. Biomass as Renewable Energy Source
	2 nd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	3 rd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	4 th	4.4. Combustion and fermentation.
	5 th	Tutorial
9 th	1 st	4.5. Anaerobic digestion
	2 nd	4.6. Types of biogas digester.
	3 rd	4.6. Types of biogas digester.
	4 th	4.6. Types of biogas digester.
	5 th	Tutorial
10 th	1 st	4.7. Wood gasifier.
	2 nd	4.8. Pyrolysis,.
	3 rd	4.9. Applications: Bio gas, Bio diesel

	4 th	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	5 th	Tutorial
11 th	1 st	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	2 nd	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	3 rd	5.2. Ocean Thermal Energy Conversion (OTEC).
	4 th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5 th	Tutorial
12 th	1 st	5.3. Geothermal Energy – Classification.
	2 nd	5.3. Geothermal Energy – Classification.
	3 rd	5.3. Geothermal Energy – Classification.
	4 th	5.4. Hybrid Energy Systems.
	5 th	Tutorial
13 th	1 st	5.3. Geothermal Energy – Classification.
	2 nd	5.4. Hybrid Energy Systems.
	3 rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4 th	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	5 th	Tutorial
14 th	1 st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	2 nd	5.7. Electric and hybrid electric vehicles.
	3 rd	5.7. Electric and hybrid electric vehicles.
	4 th	5.7. Electric and hybrid electric vehicles.
	5 th	Tutorial
15 th	1 st	5.4. Hybrid Energy Systems.
	2 nd	5.5. Need for Hybrid Systems.
	3 rd	Revision - Biomass Power
	4 th	Revision - Biomass Power
	5 th	Tutorial

Preeti Pragnan

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2025

Discipline: Electrical Engg.	Semester: 6 th (SEC-A)	Name of the Teaching Faculty: Preeti Pragyan
Subject: TH-3 (Control System Engineering)	No. of days/per week class allotted: 4p/week Tutorial: 1p/week	Semester From: 22.12.2025 to 18.04.2026
Week	Class Day	Theory Topics
1 st	1 st	1. FUNDAMENTAL OF CONTROL SYSTEM 1.1. Classification of Control system 1.2. Open loop system & Closed loop system and its comparison
	2 nd	1.3. Effects of Feed back 1.4. Standard test Signals (Step, Ramp, Parabolic, Impulse Functions)
	3 rd	1.5. Servomechanism
	4 th	2. MATHEMATICAL MODEL OF A SYSTEM 2.1. Transfer Function & Impulse response, 2.2. Properties, Advantages & Disadvantages of Transfer Function
	5 th	Tutorial
2 nd	1 st	2.3. Poles & Zeroes of transfer Function 2.4. Simple problems of transfer function of network.
	2 nd	2.5. Mathematical modeling of Electrical Systems (R, L, C, Analogous systems)
	3 rd	Tutorial
	4 th	3. CONTROL SYSTEM COMPONENTS 3.1. Components of Control System
	5 th	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
3 rd	1 st	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors. (Contd)
	2 nd	3.2. Gyroscope, Synchros, Tachometer, DC servomotors, Ac Servomotors.
	3 rd	Tutorial
	4 th	4. BLOCK DIAGRAM ALGEBRA & SIGNAL FLOW GRAPHS 4.1. Definition: Basic Elements of Block Diagram
	5 th	4.2. Canonical Form of Closed loop Systems 4.3. Rules for Block diagram reduction (Contd)
4 th	1 st	4.3. Rules for Block diagram reduction (Contd) 4.4. Procedure for of Reduction of Block Diagram
	2 nd	4.5. Simple Problem for equivalent transfer function (Contd.)
	3 rd	Tutorial
	4 th	4.5. Simple Problem for equivalent transfer function 4.6. Basic Definition in Signal Flow Graph & properties
	5 th	4.7. Construction of Signal Flow graph from Block diagram 4.8. Mason's Gain formula
5 th	1 st	4.9. Simple problems in Signal flow graph for network (Contd.)
	2 nd	4.9. Simple problems in Signal flow graph for network.
	3 rd	Tutorial
	4 th	5. TIME RESPONSE ANALYSIS. 5.1 Time response of control system. 5.2 Standard Test signal. 5.2.1. Step signal, 5.2.2. Ramp Signal 5.2.3. Parabolic Signal 5.2.4. Impulse Signal 5.3 Time Response of first order system with: 5.3.1. Unit step response
	5 th	5.3.2. Unit impulse response. 5.4 Time response of second order system to the unit step input. 5.4.1. Time response specification. (Contd.)
6 th	1 st	5.4.1. Time response specification.

		5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.(Contd.)
	2 nd	5.4.2. Derivation of expression for rise time, peak time, peak overshoot, settling time and steady state error.
	3 rd	Tutorial
	4 th	5.4.3. Steady state error and error constants(cont.)
	5 th	5.4.3. Steady state error and error constants
7 th	1 st	5 .5 Types of control system.[Steady state errors in Type-0, Type-1, Type-2 system]
	2 nd	5 .6 Effect of adding poles and zero to transfer function.
	3 rd	Tutorial
	4 th	5 .7 Response with P, PI, PD and PID controller(Contd.)
	5 th	5 .7 Response with P, PI, PD and PID controller
8 th	1 st	6. ANALYSIS OF STABILITY BY ROOT LOCUS TECHNIQUE. 6. 1 Root locus concept.(cont.)
	2 nd	6. 1 Root locus concept.
	3 rd	Tutorial
	4 th	6. 2 Construction of root loci.(cont.)
	5 th	6. 2 Construction of root loci.
9 th	1 st	6. 3 Rules for construction of the root locus. (cont.)
	2 nd	6. 3 Rules for construction of the root locus.(cont.)
	3 rd	Tutorial
	4 th	6. 3 Rules for construction of the root locus.(cont.)
	5 th	6. 3 Rules for construction of the root locus.(cont.)
10 th	1 st	6. 3 Rules for construction of the root locus.
	2 nd	6. 4 Effect of adding poles and zeros to G(s) and H(s).
	3 rd	Tutorial
	4 th	7. FREQUENCY RESPONSE ANALYSIS. 7. 1 Correlation between time response and frequency response.
	5 th	7. 2 Polar plots.(cont.)
11 th	1 st	7. 2 Polar plots.(cont.)
	2 nd	7. 2 Polar plots.(cont.)
	3 rd	Tutorial
	4 th	7. 3 Bode plots.(cont.)
	5 th	7. 3 Bode plots.(cont.)
12 th	1 st	7. 3 Bode plots.(cont.)
	2 nd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin(contd,)
	3 rd	7. 4 All pass and minimum phase system. 7. 5 Computation of Gain margin and phase margin
	4 th	Tutorial
	5 th	7. 6 Log magnitude versus phase plot.
13 th	1 st	7. 7 Closed loop frequency response.
	2 nd	8. NYQUIST PLOT 8.1 Principle of argument
	3 rd	8.2 Nyquist stability criterion.(cont.)
	4 th	Tutorial
	5 th	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)
14 th	1 st	8.3 Nyquist stability criterion applied to inverse polar plot.(cont.)

	2 nd	8.3 Nyquist stability criterion applied to inverse polar plot.
	3 rd	8.4 Effect of addition of poles and zeros to $G(S)$ $H(S)$ on the shape of Nyquist plot.
	4 th	Tutorial
	5 th	8.5 Assessment of relative stability.
15 th	1 st	8.6 Constant M and N circle.(cont.)
	2 nd	8.6 Constant M and N circle
	3 rd	8.7 Nicholas chart.(contd.)
	4 th	8.7 Nicholas chart.
	5 th	Tutorial

Preeti Pragnan

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2026

Discipline: Electrical	Semester: 4 th	Name of the Teaching Faculty: PREETI PRAGYAN
Subject: Linear Control System	No. of days/per week class allotted: 3p/week	Semester from: 22.12.2025 to 18.04.2026 No. of weeks: 15 weeks
Week	Class/week	Theory Topics
1 st	1 st	Unit-I: Introduction to Laplace Transform., Open loop and closed loop control systems: Feedback principle.
	2 nd	Transfer function of LTI systems
	3 rd	Mechanical and Electromechanical systems – Force voltage and force current analogy
2 nd	1 st	block diagram representation
	2 nd	block diagram reduction
	3 rd	block diagram reduction
3 rd	1 st	signal flow graph
	2 nd	Mason's gain formula
	3 rd	characteristic equation
4 th	1 st	Unit-II-Control system components: DC and AC servo motors
	2 nd	synchro
	3 rd	Gyroscope, Tacho generator
5 th	1 st	stepper motor
	2 nd	Time domain analysis of control systems: Transient and steady state responses
	3 rd	time domain specifications
6 th	1 st	first order systems step responses of first order systems.
	2 nd	Second order systems step responses of second order systems.
	3 rd	Second order systems step responses of second order systems.
7 th	1 st	Unit-III- Error analysis: Steady-state error analysis
	2 nd	Steady-state error analysis
	3 rd	static error coefficient of type 0, 1, 2 systems
8 th	1 st	static error coefficient of type 0, 1, 2 systems
	2 nd	Dynamic error coefficients
	3 rd	Dynamic error coefficients
9 th	1 st	Concept of stability: Time response for various pole locations
	2 nd	stability of feedback system
	3 rd	Routh's stability criterion
10 th	1 st	Unit IV-Root locus and Polar plot: General rules for constructing Root loci
	2 nd	General rules for constructing Root loci
	3 rd	stability from root loci
11 th	1 st	effect of addition of poles and zeros
	2 nd	Lag, Lead and Lead-Lag compensators
	3 rd	Lag, Lead and Lead-Lag compensators
12 th	1 st	Nyquist stability criterion
	2 nd	Nichols chart
	3 rd	Non-minimum phase system
13 th	1 st	transportation lag.
	2 nd	Unit V-Frequency domain analysis: Frequency domain specifications
	3 rd	Frequency domain specifications
14 th	1 st	Analysis based on Bode plot
	2 nd	Analysis based on Bode plot
	3 rd	Log magnitude vs. phase plot
15 th	1 st	State space model
	2 nd	State Transition matrix
	3 rd	State Transition matrix

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