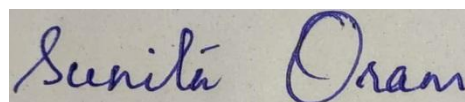


ACADEMIC LESSON PLAN OF SUMMER 2025

Discipline: Electrical Engg.	Semester: 6 th (SEC-A)	Name of the Teaching Faculty: SUNITA ORAM
Subject: TH-3 (Control System Engineering)	No. of days/per week class allotted: 4p/week Tutorial: 1p/week	Semester from: 04 th FEBRUARY 2025 to 17 th MAY 2025 No. of weeks: 15 weeks
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 th	5.3 Time Response of first order system with: 5.3.1. Unit step response 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



Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2025

Discipline: ELECTRICAL	Semester: 4 th Sem (Sec A)	Name of the Teaching Faculty: Sunita Oram
Subject: ENERGY CONVERSION-I TH. 1	No. of days/per week class allotted:4p/week Tutorial:1p/week	Semester From : : 04 th FEBRUARY 2025 to 17 th MAY 2025 No. of weeks:15 weeks
Week	Class Day	Theory Topics
1 st	1 st	1.D.C GENERATOR: 1.1 Operating principle of generator
	2 nd	1.2 Constructional features of DC machine 1.2.1 Yoke, Pole & field winding, Armature, Commutator
	3 rd	1.2.2 Armature winding, back pitch, Front pitch, Resultant pitch and commutator- pitch.
	4 th	1.2.3 Simple Lap and wave winding, Dummy coils
	5 th	Tutorial
2 nd	1 st	1.3 Different types of D.C. machines (Shunt, Series and Compound)(contd...)
	2 nd	1.3 Different types of D.C. machines (Shunt, Series and Compound)
	3 rd	1.4 Derivation of EMF equation of DC generators. (Solve problems) (contd...)
	4 th	1.4 Derivation of EMF equation of DC generators. (Solve problems)
	5 th	Tutorial
3 rd	1 st	1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems(contd..)
	2 nd	1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	3 rd	1.6. Armature reaction in D.C. machine (contd...)
	4 th	1.6. Armature reaction in D.C. machine
	5 th	Tutorial
4 th	1 st	1.7. Commutation and methods of improving commutation
	2 nd	1.7 Commutation and methods of improving commutation (contd...)
	3 rd	1.8 Characteristics of D.C. Generators 1.9. Application of different types of D.C. Generators.
	4 th	1.10. Concept of critical resistance and critical speed of DC shunt generator 1.11. Conditions of Build-up of emf of DC generator.
	5 th	Tutorial
5 th	1 st	1.12. Parallel operation of D.C. Generators. 1.13. Uses of D.C generators.
	2 nd	2.D. C. MOTORS 2.1 Basic working principle of DC motor.
	3 rd	2.2 Significance of back emf in D.C. Motor
	4 th	2.3 Voltage equation of D.C. Motor and condition for maximum power output (simple Problems)(contd...)
	5 th	Tutorial
6 th	1 st	2.3 Voltage equation of D.C. Motor and condition for maximum power output(simple problems)
	2 nd	2.4. Derive torque equation (solve problems)(contd...)
	3 rd	2.4. Derive torque equation (solve problems)

	4 th	2.5. Characteristics of shunt, series and compound motors and their application.
	5 th	Tutorial
7 th	1 st	2.6. Starting method of shunt, series and compound motors.
	2 nd	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems(contd...)
	3 rd	2.7. Speed control of D.C shunt motors by Flux control method. Armature voltage Control method. Solve problems
	4 th	2.8. Speed control of D.C. series motors by Field Flux control method, Tapped field method and series-parallel method
	5 th	Tutorial
8 th	1 st	2.9. Determination of efficiency of D.C. Machine by Brake test method (solve numerical problems)
	2 nd	2.10. Determination of efficiency of D.C. Machine by Swinburne's Test method (solve numerical problems)
	3 rd	2.11. Losses, efficiency and power stages of D.C. motor (solve numerical problems) (contd...)
	4 th	2.11. Losses, efficiency and power stages of D.C. motor (solve numerical problems) 2.12. Uses of D.C. motors
	5 th	Tutorial
9 th	1 st	3. SINGLE PHASE TRANSFORMER 3.1 Working principle of transformer
	2 nd	3.2 Constructional feature of Transformer.
	3 rd	3.2.1 Arrangement of core & winding in different types of transformer.
	4 th	3.2.2 Brief ideas about transformer accessories such as conservator, tank, breather, and explosion vent etc.
	5 th	Tutorial
10 th	1 st	3.2.3 Explain types of cooling methods 3.3 State the procedures for Care and maintenance
	2 nd	3.4 EMF equation of transformer.
	3 rd	3.5 Ideal transformer voltage transformation ratio
	4 th	3.6 Operation of Transformer at no load, on load with phasor diagrams.(contd...)
	5 th	Tutorial
11 th	1 st	3.6 Operation of Transformer at no load, on load with phasor diagrams.
	2 nd	3.7 Equivalent Resistance, Leakage Reactance and Impedance of transformer.
	3 rd	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using UPF, leading pf and lagging pf load.(contd...)
	4 th	3.8 To draw phasor diagram of transformer on load, with winding Resistance and Magnetic leakage with using UPF, leading pf and lagging pf load.
	5 th	Tutorial
12 th	1 st	3.9 To explain Equivalent circuit and solve numerical problems
	2 nd	3.10 Approximate & exact voltage drop calculation of a Transformer 3.11 Regulation of transformer.
	3 rd	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test. (Solve numerical problems)(contd...)
	4 th	3.12 Different types of losses in a Transformer. Explain Open circuit and Short Circuit test.(Solve numerical problems)
	5 th	Tutorial
13 th	1 st	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems) (contd...)
	2 nd	3.13 Explain Efficiency, efficiency at different loads and power factors, condition for maximum efficiency (solve problems)
	3 rd	3.14 Explain All Day Efficiency (solve problems)

	4 th	3.15 Determination of load corresponding to Maximum efficiency.
	5 th	Tutorial
14 th	1 st	3.16 Parallel operation of single phase transformer.
	2 nd	4. AUTO TRANSFORMER 4.1. Constructional features of Auto transformer. 4.2. Working principle of single phase Auto Transformer
	3 rd	4.3. Comparison of Auto transformer with an two winding transformer (saving of Copper). 4.4. Uses of Auto transformer
	4 th	4.5. Explain Tap changer with transformer (on load and off load condition)
	5 th	Tutorial
15 th	1 st	5. INSTRUMENT TRANSFORMERS 5.1 Explain Current Transformer and Potential Transformer
	2 nd	5.1 Explain Current Transformer and Potential Transformer(contd...)
	3 rd	5.2 Define Ratio error, Phase angle error, Burden.
	4 th	5.3 Uses of C.T. and P.T
	5 th	Tutorial

Signature of Teaching Faculty

ACADEMIC LESSON PLAN OF SUMMER 2025

Discipline: ELECTRICAL	Semester: 4 th Sem (Sec B)	Name of the Teaching Faculty: Sunita Oram
Subject: ENERGY CONVERSION-I TH. 1	No. of days/per week class allotted:4p/week Tutorial:1p/week	Semester From: : 04 th FEBRUARY 2025 to 17 th MAY 2025 No. of weeks:15 weeks
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1 st	1 st	1.D.C GENERATOR: 1.1 Operating principle of generator
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	4 th	1.2.3 Simple Lap and wave winding, Dummy coils
	5 th	Tutorial
2 nd	1 st	1.3 Different types of D.C. machines (Shunt, Series and Compound)(contd...)
	2 nd	1.3 Different types of D.C. machines (Shunt, Series and Compound)
	3 rd	1.4 Derivation of EMF equation of DC generators. (Solve problems) (contd...)
	4 th	1.4 Derivation of EMF equation of DC generators. (Solve problems)
	5 th	Tutorial
3 rd	1 st	1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems(contd..)
	2 nd	1.5 Losses and efficiency of DC generator. Condition for maximum efficiency and numerical problems.
	3 rd	1.6. Armature reaction in D.C. machine (contd...)
	4 th	1.6. Armature reaction in D.C. machine
	5 th	Tutorial
4 th	1 st	1.7. Commutation and methods of improving commutation
	2 nd	1.7 Commutation and methods of improving commutation (contd...)
	3 rd	1.8 Characteristics of D.C. Generators 1.9. Application of different types of D.C. Generators.
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