# Lesson Plan

| | Discipline: ETC | Semester-6th Summer-2024 | Name of the Teachng Faculty: Payal Bindia Parida(GF, ETC Engg) |
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| Sl. No. | Subject-TH-2 CONTROL SYSTEM &COMPONENT | No. Of Days/Week class alloted:04 | Semester From date: 16.01.2024 To date: 26.04.2024 (No of weeks: 15) |
| | **Weeks/Months** | **Class Day** | **Topic** |
| 1 | 3rd week 16 jan To 20 jan | 1st | 1. Fundamental of Control System |
| | | 2nd | 1.1 Classification of Control system |
| | | 3rd | 1.2 Open loop system & Closed loop system and its comparison |
| | | 4th | 1.3 Effects of Feed back |
| 2 | 4th week 22 jan To 27 jan | 1st | 1.4 Standard test Signals(Step, Ramp, Parabolic,Impulse |
| | | 2nd | 1.5 Servomechanism |
| | | 3rd | 1.6 Regulators ( Regulating systems) |
| | | 4th | 2. Transfer Functions. |
| 3 | 5th week 29 jan To 1st week 03 feb | 1st | 2.1 Transfer Function of a system & Impulse response. |
| | | 2nd | 2.2 Properties,Advantages& Disadvantages of Transfer Function |
| | | 3rd | 2.3 Poles & Zeroes of transfer Function. |
| | | 4th | 2.4 Representation of poles & Zero on the s-plane. |
| 4 | 2nd week 05 feb To 10 feb | 1st | 2.5 Simple problems of transfer function of network. |
| | | 2nd | 3. Control system Components & mathematical modelling of physical System. |
| | | 3rd | 3.1 Components of Control System. |
| | | 4th | 3.2 Potentiometer, Synchros, Diode modulator & demodulator , |
| 5 | 3rd week 12 feb To 17 feb | 1st | 3.3 DC motors, AC Servomotors |
| | | 2nd | 3.4 Modelling of Electrical Systems(R, L, C, Analogous systems) |
| | | 3rd | 4. Block Diagram & Signal Flow Graphs(SFG) |
| | | 4th | 4.1 Definition of Basic Elements of a Block Diagram |
| 6 | 4th week 19 feb To 24 feb | 1st | 4.2 Canonical Form of Closed loop Systems |
| | | 3rd | 4.3 Rules for Block diagram Reduction |
| | | 3rd | 4.4 Procedure for of Reduction of Block Diagram. |
| | | 4th | 4.5 Simple Problem for equivalent transfer function . |
| 7 | 5th week 26 feb To1st week 02 march | 1st | 4.6 Basic Definition in SFG & properties. |
| | | 2nd | 4.7 Mason's Gain formula |
| | | 3rd | 4.8 Steps foe solving Signal flow Graph. |
| | | 4th | 4.9 Simple problems in Signal flow graph for network. |
| 8 | 2nd week 04 march To 09 march | 1st | 5. Time Domain Analysis of Control Systems. |
| | | 2nd | 5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness. |
| | | 3rd | 5.2 System Time Response. |
| | | 4th | 5.3 Analysis of Steady State Error. |
| 9 | 3rd week 11 march To 16 march | 1st | 5.4 Types of Input & Steady state Error(Step ,Ramp, Parabolic) |
| | | 2nd | 5.5 Parameters of first order system & second-order systems |
| | | 3rd | 5.6 Derivation of time response Specification (Delay time, Rise time, Peak time,Setting time,Peak over shoot) |
| | | 4th | 6. FeedbackCharacteristics of Control Systems. |
| 10 | 4th week 18 march To 23 march | 1st | 6.1 Effect of parameter variation in Open loop System & Closed loop Systems. |
| | | 2nd | 6.2 Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and derivative |
| | | 3rd | 6.3 Effect of feedback on overall gain, Stability. |
| | | 4th | 6.4 Realisation of Controllers( P, PI,PD,PID) with OPAMP |

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| | 5th week 25 march To 30 march | 2nd | 7.1 Effect of location of poles on stability. |
| | | 3rd | 7.2 RouthHurwitz stability criterion. |
| | | 4th | 7.3 Steps for Root locus method. |
| 12 | 1st week 01 april To 06 april | 1st | 7.4 Root locus method of design(Simple problem) |
| | | 2nd | 8. Frequency-response analysis&Bode Plot |
| | | 3rd | 8.1 Frequencyresponse,Relationship between time & frequency response |
| | | 4th | 8.2 Methods of Frequency response. |
| 13 | 2nd week 08 april To 13 april | 1st | 8.3 Polar plots & steps for polar plot. |
| | | 2nd | 8.4 Bodes plot & steps for Bode plots. |
| | | 3rd | 8.5 Stability in frequency domain, Gain Margin& Phase margin. |
| | | 4th | 8.6 Nyquist plots. Nyquiststability criterion. |
| 14 | 3rd week 15 april To 20 april | 1st | 8.7 Simple problems as above. |
| | | 2nd | 9. State variable Analysis |
| | | 3rd | 9.1 Concepts of state, state variable, state model, |
| | | 4th | Stability in frequency domain, Gain Margin& Phase margin. |
| 15 | 4th week 22 april To 26 april | 1st | Frequencyresponse,Relationship between time & frequency response |
| | | 2nd | Effect of feedback on overall gain, Stability |
| | | 3rd | Parameters of first order system & second-order systems |
| | | 4th | Bodes plot & steps for Bode plots. |

Signature of the Faculty

# Lesson Plan

| | Discipline: ETC | Semester-4th Summer-2024 | Name of the Teachng Faculty: Payal Bindia Parida(GF, ETC Engg) |
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| Sl. No. | Subject-Th.1 (ELECTRICAL MACHINE) | No. Of Days/Week class alloted:04 | Semester From date: 16.01.2024 To date: 26.04.2024 (No of weeks: 15) |
| | Weeks/Months | Class Day | Topic |
| 1 | 3rd week 16 jan To 20 jan | 1st | Unit-1. ELECTRICAL MATERIAL(INTRODUCTION) |
| | | 2nd | 1.1 Properties & uses of different conducting material |
| | | 3rd | 1.2 Properties & use of various insulating materials used electrical engineering. |
| | | 4th | 1.3 Various magnetic materials & their uses. |
| 2 | 4th week 22 jan To 27 jan | 1st | Unit-2. DC GENERATOR(INTRODUCTION) |
| | | 2nd | 2.1 Construction, Principle & application of DC Generator. |
| | | 3rd | 2.2 Classify DC generator including voltage equation. |
| | | 4th | 2.3 Derive EMF equation & simple problems. |
| 3 | 5th week 29 jan To 1st week 03 feb | 1st | 2.3 Derive EMF equation & simple problems. |
| | | 2nd | 2.4 Parallel operation of DC generators. |
| | | 3rd | Unit-3. DC MOTOR(INTRODUCTION) |
| | | 4th | 3.1 Principle of working of a DC motor |
| 4 | 2nd week 05 feb To 10 feb | 1st | 3.2 Concept of development of torque & back EMF in DC motor including simple problems. |
| | | 2nd | 3.3 Derive equation relating to back EMF, Current, Speed and Torque equation. |
| | | 3rd | 3.4 Classify DC motors & explain characteristics, application. |
| | | 4th | 3.5 Three point & four point stator/static of DC motor by solid State converter. |
| 5 | 3rd week 12 feb To 17 feb | 1st | 3.6 Speed of DC motor by field control and armature control method. |
| | | 2nd | 3.7 Power stages of DC motor & derive Efficiency of a DC motor. |
| | | 3rd | Unit-4. AC CIRCUITS(INTRODUCTION) |
| | | 4th | 4.1 Mathematical representation of phasors, significant of operator "J |
| 6 | 4th week 19 feb To 24 feb | 1st | 4.2 Addition, Subtraction, Multiplication and Division of phasor quantities. |
| | | 3rd | 4.3 AC series circuits containing resistance, capacitances, Conception of active, Reactive and apparent power and Q-factor of series circuits & solve related problems. |
| | | 3rd | 4.3 AC series circuits containing resistance, capacitances, Conception of active, Reactive and apparent power and Q-factor of series circuits & solve related problems |
| | | 4th | 4.4 Find the relation of AC Parallel circuits containing Resistances, Inductance and Capacitances Q-factor of parallel circuits. |
| 7 | 5th week 26 feb To1st week 02 march | 1st | Unit-5.TRANSFORMER(INTRODUCTION) |
| | | 2nd | 5.1 Ideal transformer. |
| | | 3rd | 5.2 Construction & working principle of transformer. |
| | | 4th | 5.3 Derive of EMF equation of transformer, voltage transformation ratio. |

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| 8 | 2nd week 04 march To 09 march | 1st | 5.4 Discuss Flux, Current, EMF components of transformer and their phasor diagram under no load Condition. |
| | | 2nd | 5.5 Phasor representation of transformer flux, current EMF primary and secondary Voltages under loadedcondition. |
| | | 3rd | 5.6 Types of losses in Single Phase (1-ø) Transformer. |
| | | 4th | 5.7 Open circuit & short-circuit test (simple problems) |
| 9 | 3rd week 11 march To 16 march | 1st | Open circuit & short-circuit test (simple problems) |
| | | 2nd | 5.8 Parallel operation of Transformer. |
| | | 3rd | 5.9 Auto Transformer |
| | | 4th | Unit-6. INDUCTION MOTOR |
| 10 | 4th week 18 march To 23 march | 1st | 1 Construction feature, types of three-phase induction motor |
| | | 2nd | Establish relation between torque, rotor current and power factor. |
| | | 3rd | Parallel operation of Transformer. |
| | | 4th | Open circuit & short-circuit test (simple problems) |
| 11 | 5th week 25 march To 30 march | 1st | 6.2 Principle of development of rotating magnetic field in the stator. |
| | | 2nd | 6.3 Establish relationship between synchronous speed, actual speed and slip of induction motor |
| | | 3rd | Auto Transformer |
| | | 4th | 6.4 Establish relation between torque, rotor current and power factor |
| 12 | 1st week 01 april To 06 april | 1st | 6.5 Explain starting of an induction motor by using DOL and Star-Delta stator. State industrial use of induction motor. |
| | | 2nd | Establish relation between torque, rotor current and power factor. |
| | | 3rd | Principle of development of rotating magnetic field in the stator. |
| | | 4th | Unit-7. SINGLE PHASE INDUCTION MOTOR |
| 13 | 2nd week 08 april To 13 april | 1st | Parallel operation of Transformer. |
| | | 2nd | Establish rel tionship between synchronous speed, actual speed and slip of induction motor |
| | | 3rd | Open circuit & short-circuit test (simple problems) |
| | | 4th | Explain starting of an induction motor by using DOL and Star-Delta stator. State industrial use of induction motor. |
| 14 | 3rd week 15 april To 20 april | 1st | 7.1 Construction features and principle of operation of capacitor typ and shaded pole type of single-phase induction motor |
| | | 2nd | Principle of development of rotating magnetic field in the stator. |
| | | 3rd | Auto Transformer |
| | | 4th | 7.3 Concept of alternator & its application. |
| 15 | 4th week 22 april To 26 april | 1st | Parallel operation of Transformer. |
| | | 2nd | Concept of alternator & its application. |
| | | 3rd | Explain construction & operation of AC series motor |
| | | 4th | Principle of development of rotating magnetic field in the stator. |

Signature of the Faculty