# GANDHI SCHOOL OF ENGINEERING

## BHABANDHA, BERHAMPUR

**BRANCH:- ELECTRONICS & TELECOMMUNICATION ENGINEERING**

**SEMESTER:- 6TH**

**SUBJECT:- CONTROL SYSTEMS & COMPONENT**

**Name of the Faculty- ER. SATYABRATA TRIPATHY**

| | | Topic to be taken | | | | Actual topictaken | | |
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| **Sl. No** | **Topic/Module** | **No. of period** | **Details of the topics** | **Date** | **Topic No.** | **Topic Name** | **Date** | **Remarks** |
| 1 | FUNDAMENTAL OF CONTROL SYSTEM | 05 | 1.1 Classification of Control system<br>1.2 Open loop system & Closed loop system and its comparison<br><br>1.3 Effects of Feed back<br><br>1.4 Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)<br><br>1.5 Servomechanism<br><br>1.6 Regulators ( Regulating systems) | 13/02/2023 TO 22/02/2023 | 1.1<br>1.2<br>1.3<br>1.4<br>1.5<br>1.6 | Classification of Control system<br>Open loop system & Closed loop system and its comparison<br><br>Effects of Feed back<br><br>Standard test Signals(Step, Ramp, Parabolic, Impulse Functions)<br><br>Servomechanism<br><br>Regulators ( Regulating systems | 13/02/2023<br>15/02/2023<br>17/02/2023<br>20/02/2023<br>22/02/2023 | |

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| 2 | TRANSFER FUNCTIONS | 08 | 2.1 Transfer Function of a system & Impulse response,<br>2.2 Properties,Advantages& Disadvantages of Transfer Function<br>2.3 Poles & Zeroes of transfer Function<br>2.4 Representation of poles & Zero on the s-plane<br><br>2.5 Simple problems of transfer function of network | 24/02/2023 TO 04/03/2023 | 2.1<br>2.2<br>2.3<br>2.4<br>2.5 | Transfer Function of a system & Impulse response,<br>Properties,Advantages& Disadvantages of Transfer Function<br>Poles & Zeroes of transfer Function<br>Representation of poles & Zero on the s-plane<br><br>Simple problems of transfer function of network | 24/02/2023<br>25/02/2023<br>27/02/2023<br>01/03/2023<br>03/03/2023<br>04/03/2023 | |

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| 3 | CONTROL SYSTEM COMPONENTS & MATHEMATICAL MODELLING OF PHYSICAL SYSTEM | 05 | 3.1 Components of Control System<br><br>3.2 Potentiometer, Synchros, Diode modulator & demodulator ,<br><br>3.3 DC motors, AC Servomotors<br><br>3.4 Modelling of Electrical Systems(R, L, C, Analogous systems) | 06/03/2023 TO 15/03/2023 | 3.1<br>3.2<br>3.3<br>3.4 | Components of Control System<br><br>Potentiometer, Synchros, Diode modulator & demodulator ,<br><br>DC motors, AC Servomotors<br><br>Modelling of Electrical Systems(R, L, C, Analogous systems) | 06/03/2023<br>10/03/2023<br>11/03/2023<br>13/03/2023<br>14/03/2023<br>15/03/2023 | |
| 4 | BLOCK DIAGRAM & SIGNAL FLOW GRAPHS(SFG) | 08 | 4.1 Definition of Basic Elements of a Block Diagram<br><br>4.2 Canonical Form of Closed loop Systems<br><br>4.3 Rules for Block diagram Reduction<br><br>4.4 Procedure for of Reduction of Block Diagram<br><br>4.5 Simple Problem for equivalent transfer function<br><br>4.6 Basic Definition in SFG & properties<br><br>4.7 Mason's Gain formula<br>4.8 Steps foe solving Signal flow Graph<br><br>4.9 Simple problems in Signal flow graph for network | 16/03/2023 TO 25/03/2023 | 4.1<br>4.2<br>4.3<br>4.4<br>4.5<br>4.6<br>4.7<br>4.8<br>4.9 | Definition of Basic Elements of a Block Diagram<br><br>Canonical Form of Closed loop Systems<br><br>Rules for Block diagram Reduction<br><br>Procedure for of Reduction of Block Diagram<br><br>Simple Problem for equivalent transfer function<br><br>Basic Definition in SFG & properties<br><br>Mason's Gain formula<br>Steps foe solving Signal flow Graph<br><br>Simple problems in Signal flow graph for network | 06/03/2023<br>17/03/2023<br>18/03/2023<br>20/03/2023<br>22/03/2023<br>24/03/2023<br>25/03/2023 | |

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| 5 | TIME DOMAIN ANALYSIS OF CONTROL SYSTEMS | 08 | 5.1 Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.<br><br>5.2 System Time Response<br><br>5.3 Analysis of Steady State Error<br><br>5.4 Types of Input & Steady state Error(Step ,Ramp, Parabolic)<br><br>5.5 Parameters of first order system & second-order systems<br><br>5.6 Derivation of time response Specification (Delay time, Rise time, Peak time,Setting time,Peak over shoot) | 27/03/2023 TO 08/04/2023 | 5.1<br>5.2<br>5.3<br>5.4<br>5.5<br>5.6 | Definition of Time, Stability, steady-state response, accuracy, transient accuracy, In-sensitivity and robustness.<br><br>System Time Response<br><br>Analysis of Steady State Error<br><br>Types of Input & Steady state Error(Step ,Ramp, Parabolic)<br><br>Parameters of first order system & second-order systems<br><br>Derivation of time response Specification (Delay time, Rise time, Peak time,Setting time,Peak over shoot) | 27/03/2023<br>29/03/2023<br>31/03/2023<br>03/04/2023<br>04/04/2023<br>05/04/2023<br>06/04/2023<br>08/04/2023 | |
| 6 | FEEDBACKCHARACTERISTICS OF CONTROL SYSTEMS | 06 | 6.1 Effect of parameter variation in Open loop System & Closed loop Systems<br><br>6.2 Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and derivative | 10/04/2023 TO 25/04/2023 | 6.1<br>6.2<br>6.3<br>6.4 | Effect of parameter variation in Open loop System & Closed loop Systems<br><br>Introduction to Basic control Action& Basic modes of feedback control: proportional, integral and | 10/04/2023<br>12/04/2023<br>15/04/2023<br>17/04/2023<br>19/04/2023<br>21/04/2023<br>24/04/2023<br>25/04/2023 | |

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| | | | 6.3 Effect of feedback on overall gain, Stability<br><br>6.4 Realisation of Controllers( P, PI,PD,PID) with OPAMP | | | derivative<br><br>Effect of feedback on overall gain, Stability<br><br>Realisation of Controllers( P, PI,PD,PID) with OPAMP | | |
| 7 | STABILITY CONCEPT, & ROOT LOCUS METHOD | 08 | 7.1 Effect of location of poles on stability<br><br>7.2 RouthHurwitz stability criterion.<br><br>7.3 Steps for Root locus method<br><br>7.4 Root locus method of design(Simple problem) | 26/04/2023 TO 01/05/2023 | 7.1<br>7.2<br>7.3<br>7.4 | Effect of location of poles on stability<br><br>RouthHurwitz stability criterion.<br><br>Steps for Root locus method<br><br>Root locus method of design(Simple problem) | 26/04/2023<br>26/04/2023<br>27/04/2023<br>28/04/2023<br>29/04/2023<br>01/05/2023 | |
| 8 | FREQUENCY-RESPONSE ANALYSIS&BODE PLOT | 07 | 8.1 Frequencyresponse,Relationship between time & frequency response<br><br>8.2 Methods of Frequency response<br><br>8.3 Polar plots & steps for polar plot<br><br>8.4 Bodes plot & steps for Bode plots<br><br>8.5 Stability in frequency domain, Gain Margin& Phase margin<br><br>8.6 Nyquist plots. Nyquiststability criterion.<br><br>8.7 Simple problems as above | 03/05/2023 TO 13/05/2023 | 8.1<br>8.2<br>8.3<br>8.4<br>8.5<br>8.6<br>8.7 | Frequencyresponse,Relationship between time & frequency response<br><br>Methods of Frequency response<br><br>Polar plots & steps for polar plot<br><br>Bodes plot & steps for Bode plots<br><br>Stability in frequency domain, Gain Margin& Phase margin<br><br>Nyquist plots. Nyquiststability criterion.<br><br>Simple problems as above | 03/05/2023<br>06/05/2023<br>08/05/2023<br>09/05/2023<br>10/05/2023<br>11/05/2023<br>12/05/2023<br>13/05/2023 | |

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| 9 | STATE VARIABLE ANALYSIS | 05 | 9.1 Concepts of state, state variable, state model,<br><br>9.2 state models for linear continuous time functions(Simple) | 15/05/2023 TO 23/05/2023 | 9.1<br>9.2 | Concepts of state, state variable, state model,<br><br>state models for linear continuous time functions(Simple) | 15/05/2023<br>16/05/2023<br>17/05/2023<br>18/05/2023<br>20/05/2023<br>22/05/2023<br>23/05/2023 | |

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