**UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA**

**Academic lesson plan for summer semester - 2022**

Name of the teaching faculty: **Sandip Mishra**  Discipline / Dept.: **EE**

Semester:**5th** Subject (Theory): **CSE**

No. of periods per week: **5** Total Periods**: 75**

semester Exam: **80** Class Test:**20**

Total Marks: **100**

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| **Week** | **Period** | **UNIT/CHAPTER** | **Topic to be covered** |
|  | 1st | FUNDAMENTAL OF CONTROL SYSTEM | Introduction to CS. Classification of Control system |
| 1ST | 2nd | FUNDAMENTAL OF CONTROL SYSTEM | Open loop & Closed loop system and its comparison |
| 3rd | FUNDAMENTAL OF CONTROL SYSTEM | Effects of Feed back |
| 4th | FUNDAMENTAL OF CONTROL SYSTEM | Standard test Signals. Servomechanism |
| 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Discussion about different test signals. |
| 2ND | 1st | MATHEMATICAL MODEL OF A SYSTEM | Transfer Function & Impulse response |
| 2nd | MATHEMATICAL MODEL OF A SYSTEM | Properties, Advantages & Disadvantages of TF |
| 3rd | MATHEMATICAL MODEL OF A SYSTEM | Poles & Zeroes of TF. Problems Dis TF of network. |
| 4th | MATHEMATICAL MODEL OF A SYSTEM | Mathematical modeling of Electrical Systems. |
| 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Discussion of formulas of Laplace Transform. |
| 3RD | 1st | CONTROL SYSTEM COMPONENTS | Components of Control System |
| 2nd | CONTROL SYSTEM COMPONENTS | Gyroscope, Synchros, |
| 3rd | CONTROL SYSTEM COMPONENTS | Tachometer, DC servomotors |
| 4th | CONTROL SYSTEM COMPONENTS | Ac Servomotors |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Simple Problem Discussion on Laplace Transform |
| 4TH | 1st | BLOCK DIAGRAM ALGEBRA | Basic Elements of Block Diagram |
| 2nd | BLOCK DIAGRAM ALGEBRA | Canonical Form of Closed loop Systems |
| 3rd | BLOCK DIAGRAM ALGEBRA | Rules for Block diagram reduction |
| 4th | BLOCK DIAGRAM ALGEBRA | Procedure for of Reduction of Block Diagram |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Examples problems of Block Diagram reduction |
| 5TH | 1st | BLOCK DIAGRAM ALGEBRA | Problem for equivalent transfer function |
| 2nd | SIGNAL FLOW GRAPHS | Signal Flow Graph & properties |
| 3rd | SIGNAL FLOW GRAPHS | Construction of SFG from Block diagram |
| 4th | SIGNAL FLOW GRAPHS | Mason‘s Gain formula. problems on Signal flow graph |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Examples problems of Signal Flow Graph |
| 6TH | 1st | TIME RESPONSE ANALYSIS | Time response of control system |
| 2nd | TIME RESPONSE ANALYSIS | Standard Test signal |
| 3rd | TIME RESPONSE ANALYSIS | Time Response of 1st order system with Unit step res. |
| 4th | TIME RESPONSE ANALYSIS | Time Response of 1st order system with Unit impulse res |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Simple Problem Discussion on Time Response Analysis |
| 7TH | 1st | TIME RESPONSE ANALYSIS | Time response of 2nd order system to the unit step input |
| 2nd | TIME RESPONSE ANALYSIS | Time response of 2nd order system to the unit step input |
| 3rd | TIME RESPONSE ANALYSIS | Types of errors in control system |
| 4th | TIME RESPONSE ANALYSIS | Types of errors in control system |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Simple Problem Discussion on Time Response Analysis. |
| 8TH | 1st | TIME RESPONSE ANALYSIS | Effect of adding poles and zero to transfer function |
| 2nd | TIME RESPONSE ANALYSIS | Response with P, PI, PD and PID controller |
| 3rd | ROOT LOCUS TECHNIQUE | Root locus concept |
| 4th | ROOT LOCUS TECHNIQUE | Routh hurwitz criterion |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Examples problems of Routh hurwitz criterion |
| 9TH | 1st | ROOT LOCUS TECHNIQUE | Construction of root loci |
| 2nd | ROOT LOCUS TECHNIQUE | Rules for construction of the root locus with example |
| 3rd | ROOT LOCUS TECHNIQUE | Rules for construction of the root locus with example |
| 4th | ROOT LOCUS TECHNIQUE | Effect of adding poles and zeros to G(s) and H(s) |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Objective questions on basics of Control System |
| 10TH | 1st | ROOT LOCUS TECHNIQUE | Examples problems of Root locus Diagram |
| 2nd | ROOT LOCUS TECHNIQUE | Examples problems of Root locus Diagram |
| 3rd | ROOT LOCUS TECHNIQUE | Examples problems of Root locus Diagram |
| 4th | ROOT LOCUS TECHNIQUE | Examples problems of Root locus Diagram |
|  | 5th | TUTORIAL CUM DOUBT CLEAR | Objective questions on basics of Control System |
| 11TH | 1st | FREQUENCY RESPONSE OF SYSTEM | Correlation between time & frequency response |
| 2nd | FREQUENCY RESPONSE OF SYSTEM | Polar plots |
| 3rd | FREQUENCY RESPONSE OF SYSTEM | Bode plots. |
| 4th | FREQUENCY RESPONSE OF SYSTEM | All pass and minimum phase system |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Objective questions on basics of Control System |
| 12TH | 1st | FREQUENCY RESPONSE OF SYSTEM | Computation of Gain margin and phase margin |
| 2nd | FREQUENCY RESPONSE OF SYSTEM | Log magnitude versus phase plot. |
| 3rd | FREQUENCY RESPONSE OF SYSTEM | Closed loop frequency response |
| 4th | FREQUENCY RESPONSE OF SYSTEM | Examples problems of Bode Plot |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Objective questions on basics of Control System  12TH | 1st |  |  |
| 13th | 1st | FREQUENCY RESPONSE OF SYSTEM | Examples problems of Bode Plot | 2nd |  |  |
| 2nd | FREQUENCY RESPONSE OF SYSTEM | Examples problems of Bode Plot | 3rd |  |  |
| 3rd | NYQUIST PLOT | Principle of argument | 4th |  |  |
| 4th | NYQUIST PLOT | Niquist stability criterion | 5th |  |  |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Objective questions on basics of Control System |  |  |  |
| 14th | 1st | NYQUIST PLOT | Niquist stability criterion applied to inverse polar plot |
| 2nd | NYQUIST PLOT | addition of poles and zeros to G(S) H(S) |
| 3rd | NYQUIST PLOT | Effect on the shape of Niquist plot by pole zero addition |
| 4th | NYQUIST PLOT | Assessment of relative stability |
|  | 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Doubts of Control System. |
| 15th | 1st | NYQUIST PLOT | Constant M and N circle |
| 2nd | NYQUIST PLOT | Nicholas chart. |
| 3rd | NYQUIST PLOT | Examples problems of Nyquist Plot |
| 4th | NYQUIST PLOT | Examples problems of Nyquist Plot |
| 5th | TUTORIAL CUM DOUBT CLEAR CLASS | Doubts of Control System. |

The lesson plan prepared by the concerned faculty.

SANDIP MISHRA

PTGF, ELECTRICAL DEPARTMENT