**Lesson Plan**

Name of the Faculty: Mr. Sanjay Charaya

Discipline: ECE

Semester : 5th Semester

Subject : Control System Engineering

Lesson Plan Duration: 15 weeks

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| Week | Theory | |
| Lecture | Topic |
| 1 | 1 | Control System Components |
| 2 | Open loopm & closed loop control system |
| 3 | Servomechanism |
| 2 | 4 | Stepper Motor |
| 5 | Mathematical Models of Physical Systems |
| 6 | Differential equation of physical system |
| 3 | 7 | Transfer Function, Block diagram Algebra |
| 8 | Problems on Block diagram Algebra |
| 9 | Signal flow graphs, Mason’s Formula |
| 4 | 10 | Appluications of Mason’s Formula |
| 11 | Feedback and Non-feedback systems |
| 12 | Feed back Characteristics of control systems |
| 5 | 13 | Effects of feedback on sensitivity, stability, overall gain etc. |
| 14 | Time Response Analysis-Standard test Signals |
| 15 | Time Response of of 1st order systems |
| 6 | 16 | Time Response of of 2nd order systems |
| 17 | continued |
| 18 | Steady state erros & error constants |
| 7 | 19 | Design Specifications |
| 20 | Concept of Stability, Conditions of stability |
| 21 | Hurwitz stability criterian with example |
| 8 | 22 | Routh stability criterian with example |
| 23 | Relative stability analysis. |
| 24 | The Root locus concept, Stability analysis. |
| 9 | 25 | Construction of root loci for various systems |
| 26 | Example on Construction of root loci |
| 27 | Frequency response & Stability Analysis- Correlation between time & frequency response |
| 10 | 28 | Rules for Polar plot , |
| 29 | Example on Polar plot |
| 30 | Nyquist plot with example |
| 11 | 31 | Bode plots Rules,Phase margin & gain margin |
| 32 | Illustration with example |
| 33 | Nyquist stability criterian |
| 12 | 34 | Relative stability using Nyquist Criterion |
| 35 | Frequency response specifications |
| 36 | Compensation of Control systems-Necessity of Compensation. |
| 13 | 37 | Phase lag compensation, Phase lead compensation. |
| 38 | Phase lag lead compensation, Feedback compensation. |
| 39 | State Variable Analysis-Concept of State, State variable & state model |
| 14 | 40 | Illustration with example |
| 41 | State model for linear continuous time systems |
| 42 | Solution of state equations |
| 15 | 43 | Illustration with example |
| 44 | Concept of Controllability & Observability |
| 45 | Illustration with example |