Lesson Plan

Name of faculty : Sita Devi

Discipline : Electrical Engineering

Semester : 7th

Subject : Discrete data non linear control system (ET-405E)

Lesson plan duration : 15 weeks

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| **Week** | **Theory** | **Actual Lesson Plan Covered** |
|  | **Lecture** **Day** | **Topic** | **Date**  | **HOD Sign.** | **Director-Principal** |
| **Unit-I** |
| 1st | 1 | Introduction to discrete data non linear control system |  |  |  |
| 2 | Time variant system and its example  |  |  |  |
| 3 | Time invariant system and its example |  |  |  |
| 4 | Introduction to discrete time system |  |  |  |
| 2nd | 5 | Introduction to computer controlled system  |  |  |  |
| 6 | Mathematical treatment of sampling process |  |  |  |
| 7 | Sampling theorem |  |  |  |
| 8 | Reconstruction from sampled signal |  |  |  |
| 3rd | 9 | Transfer function of discrete data system and its numerical |  |  |  |
| 10 | Transfer function of discrete data system with cascade elements and its numerical |  |  |  |
| 11 | Transfer function of Z.O.H. and its numerical |  |  |  |
| 12 | Transfer function of closed loop discrete data system and its numerical |  |  |  |
| **Unit-II** |
| 4th | 13 | Introduction to Z- Transform |  |  |  |
| 14 | Z-Transform of discrete time function and its numerical |  |  |  |
| 15 | One-sided Z-Transform & two-sided Z-Transform |  |  |  |
| 16 | Properties of Z-Transform and its proof |  |  |  |
| 5th | 17 | Inverse Z-Transform by partial fraction method |  |  |  |
| 18 | Power series method and Residue method |  |  |  |
| 19 | Pulse transfer function and its numerical |  |  |  |
| 20 | BIBO stability and its numerical, Zero input stability |  |  |  |
| 6th | 21 | Concept of stability in Z- Plane, Z and S domain relationship  |  |  |  |
| 22 |  Bilinear transformation, Stability test of discrete data system  |  |  |  |
| 23 | Jury stability test and its numerical |  |  |  |
| 24 | Modified Routh criterion and schur cohn criterion |  |  |  |
| **7th** | **1st Minor Test** |
| **Unit-III** |
| 8th  | 25 | Introduction to non linear system |  |  |  |
| 26 | Linear and non linear system classifications |  |  |  |
| 27 | Comparison of linear and non linear system |  |  |  |
| 28 | Special feature of non linear system |  |  |  |
| 9th | 29 | Properties of non linear system |  |  |  |
| 30 | Linear verses non linear control system |  |  |  |
| 31 | Different types of non linearities |  |  |  |
| 32 | Numerical on non linear system |  |  |  |
| 10th | 33 | Limit cycle |  |  |  |
| 34 | Introduction to jump resonance |  |  |  |
| 35 | Numerical on above topic |  |  |  |
| 36 | Introduction to sub harmonics |  |  |  |
| **Unit-IV** |
| 11th | 37 | Introduction to Describing function  |  |  |  |
| 38 | Determination of describing function  |  |  |  |
| 39 | Stability analysis of describing function  |  |  |  |
| 40 | Numerical on stability analysis of describing function  |  |  |  |
| 12th | 41 | Introduction to lyapunov stability analysis  |  |  |  |
| 42 | Numerical on lyapunov stability |  |  |  |
| 43 | Stability definition |  |  |  |
| 44 | Popv,s stability criterion  |  |  |  |
| 13th | 45 | Numerical on popv,s stability |  |  |  |
| 46 | Phase plane method  |  |  |  |
| 47 | Stability analysis of phase method |  |  |  |
| 48 | Numerical on phase method |  |  |  |
| **14th** | **2nd Minor test** |
| 15th | 49 | Discussion on 2nd minor test |  |  |  |
|  | 50 | Probleam discuss on stability analysis based on describing function |  |  |  |
|  | 51 | Probleam discuss on stability analysis based on lyapunov stability |  |  |  |
|  | 52 | Probleam discuss on stability analysis based on phase plane method |  |  |  |