

SYNERGY POLYTECHNIC, BBSR

The Lesson Plan

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| Discipline: EE | Semester: 6 th | Name of the Teaching Faculty: SASWATI SANGHAMITRA PRADHAN |
| Subject: Control System Engg. | No of Days/per week class allotted: 4 | Semester from Date: 16/01/2024 to Date: 26/04/2024 |
| Week | Class Day | Theory/Practical Topics |
| 1st | 1st | Classification of C.S, Open loop & Close loop system |
| | 2nd | Effect of feedback |
| | 3rd | Standard test signals (step, ramp, parabolic, Impulse function) |
| | 4th | Servomechanism |
| | 5th | Problem (Optional) |
| 2nd | 1st | Transfer function & Impulse response |
| | 2nd | Properties, Advantages & Disadvantages of T.F |
| | 3rd | Poles & Zeros of transfer function |
| | 4th | Simple problems of T.F of network |
| | 5th | Problem |
| 3rd | 1st | Mathematical Modelling of Electrical Syst. (R, L, C, Analogy) |
| | 2nd | Components of C.S |
| | 3rd | Gyroscope |
| | 4th | Synchros |
| | 5th | Problem (Optional) |
| 4th | 1st | Tachometer |
| | 2nd | DC Servomotors & AC Servomotors |
| | 3rd | Block Diagram → Def ⁿ : Basic elements of Block diagrams |
| | 4th | Canonical form of closed loop systems |
| | 5th | (Extra class) Rules of Block Diagram Reduction |
| 5th | 1st | Procedure for Reduction of Block Diagram |
| | 2nd | Simple problem for equivalent T.F |
| | 3rd | (Signal flow Graph) Basic Definition in Signal flow graph & properties |
| | 4th | Construction of SFG from Block Diagram |
| | 5th | Problem (Optional) |

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Sign of Faculty

D. B.
HOD

S. Pradhan
Principal

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| Subject: Control System Engg. | No of Days/per week class allotted: 4 | Semester from Date: 16/01/24 to Date: 28/04/24 No of Weeks: 15 |
| Week | Class Day | Theory/Practical Topics |
| 1st | 1st | Mason's Gain formula |
| | 2nd | Simple problems in SFG for networks |
| | 3rd | " |
| | 4th | " |
| | 5th | Problem (Optional) |
| 2nd | 1st | Time Response → Time Response of control system |
| | 2nd | Analysis → Standard Test Signal |
| | 3rd | Time Response of 1 st order system |
| | 4th | Unit step Response, Unit Impulse Response |
| | 5th | Problem (Optional) |
| 3rd | 1st | Time Response of 2 nd order system to unit step |
| | 2nd | (a) Time response Specification |
| | 3rd | (b) Derivation of expression of rise time |
| | 4th | peak time, peak overshoot, settling time & steady state error |
| | 5th | Problem (Optional) |
| 4th | 1st | (c) Steady state error and error constants |
| | 2nd | Types of C.S (steady state Error Type-0, 1, 2 system) |
| | 3rd | Effect of adding poles & zeros to T.F |
| | 4th | Response with P, PI, PD & PID Controller |
| | 5th | (Extra class) " (Optional) |
| 5th | 1st | Analysis of → Root Locus concept |
| | 2nd | Stability by → Construction of root loci. |
| | 3rd | Root Locus → Rules for construction of the root locus |
| | 4th | Method → Effect of adding poles & zeros to G(s) & H(s) |
| | 5th | Problem (Optional) |

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| Week | Class Day | Theory/Practical Topics | |
| 1st | 1st | Frequency Response | → Correlation between time response & freq response |
| | 2nd | Response | → Polar Plots |
| | 3rd | Analysis | → Bode Plots |
| | 4th | | → All pass & minimum phase system |
| | 5th | | → e Problem (Optional) |
| 2nd | 1st | | → Computation of gain margin & Phase Margin |
| | 2nd | | → Log magnitude versus phase plot |
| | 3rd | | → closed loop frequency response |
| | 4th | | ” |
| | 5th | | Problem (Optional) |
| 3rd | 1st | Frequency Response | Problems of freq response analysis |
| | 2nd | Response | ” |
| | 3rd | Analysis | ” |
| | 4th | | ” |
| | 5th | | Problem (Optional) |
| 4th | 1st | Nyquist Plot | → Principle of argument |
| | 2nd | | → Nyquist stability criterion |
| | 3rd | | → Nyquist stability criterion |
| | 4th | | applied to inverse polar Plot. |
| | 5th | | Problem (Optional) |
| 5th | 1st | | Effect of adding poles & zeros to |
| | 2nd | | G(s) H(s) on the shape of Nyquist |
| | 3rd | | Plot. |
| | 4th | | Assessment of relative stability |
| | 5th | | Problem (Optional) |

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| Week | Class Day | Theory/Practical Topics | |
| 1st | 1st | Constant M & N circle. | |
| | 2nd | Nicholas Chart | |
| | 3rd | " | |
| | 4th | " | |
| | 5th | Problem | |
| 2nd | 1st | problem Solving | |
| | 2nd | " | |
| | 3rd | " | |
| | 4th | " | |
| | 5th | Problem | |
| 3rd | 1st | Problem Solving | |
| | 2nd | " | |
| | 3rd | " | |
| | 4th | " | |
| | 5th | Problem | |
| 4th | 1st | Revision class | |
| | 2nd | " | |
| | 3rd | " | |
| | 4th | " | |
| | 5th | Problem | |
| 5th | 1st | Revision class | |
| | 2nd | " | |
| | 3rd | " | |
| | 4th | " | |
| | 5th | Problem | |

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