**بسم الله الرحمن الرحيم**

**University: Diyala University**

**College: College of Engineering**

**Department:Electronic Engineering**

**Stage: Forth**

**Lecturer name: Arshed Abdulhamed**

**Qualification: Ph.D.**

**Place of work: Electronic Dept.**

**Republic of Iraq**

**The Ministry Of Higher Education**

**& Scientific Research**



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| Course Instructor |  **Arshed Abdulhamed** |
| E-mail | **Arshad\_ald@yahoo.com** |
| Title | **Mechanical Engineering** |
| Course Coordinator |  |
| Course Objective | **To teach 4th class students the concepts of control System**  |
| Course Description | **Students will learn the basics of the transfer function as well as Time response, frequency response, compensation, PID and state space. Transfer function is concerned with the making equivalent system and finding the characteristic equation. Time response is concerned with relation between types of signals and order of systems . Frequency response is concerned with the analysis of the response of the system base on frequency domain. Compensation and PID are concerned with achieving the desire reaching to the specific goals. State space is concerned with the relation between multi input multi outputs system.** |
| Textbook | 1. **Computer System Architecture By M. Morris Mano- 3rd**
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| Course Assessments | First semester | Second semester | Final Exam |
| **20 %** | **20 %** | **60 %** |
| General Notes | Type here general notes regarding the course |

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**Course Weekly Outline**

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| --- | --- | --- | --- | --- |
| Week | Date | Topics Covered | Lab. Experiment Assignments | Notes |
| 1 | **5/10/**  | Basic Definition |  |  |
| 2 | **12/10/**  | Transfer functions of electrical system |  |  |
| 3 | **19/10/**  | mechanical system & servo system |  |  |
| 4 | **26/10/**  | Block Diagram Algebra |  |  |
| 5 | **2/11/**  | Signal flow graph & mason's rule |  |  |
| 6 | **9/11/**  | Time Domain Response |  |  |
| 7 | **16/11/**  | Typical test signals & types of the systems |  |  |
| 8 | **23/11/**  | The steady-state error due to step, ramp & parabolic inputs. |  |  |
| 9 | **30/11/**  | Transient Response of Second Order Systems. |  |  |
| 10 | **7/12/**  | Stability of control system, Routh criterion, Root locus |  |  |
| 11 | **14/12/**  | Stability of control system, Routh criterion, Root locus |  |  |
| 12 | **21/12/**  | Stability of control system, Routh criterion, Root locus |  |  |
| 13 | **28/12/**  | Stability of control system, Routh criterion, Root locus |  |  |
| 14 | **4/1/**  | F**r**equency Response |  |  |
| 15 | **11/1/**  | Introduction to Nyquist plot |  |  |
| 16 | **15/2/**  | Nyquist plot |  |  |
| 17 | **22/2/**  | Phase margin |  |  |
| 18 | **1/3/**  | Gain margin |  |  |
| 19 | **8/3/**  | Introduction to Bode plot |  |  |
| 20 | **15/3/**  | LeadCompensation |  |  |
| 21 | **22/3/**  | Lag Compensation |  |  |
| 22 | **29/3/**  | Lead-Lag Compensation |  |  |
| 23 | **5/4/**  | Three-term Controller (PID) |  |  |
| 24 | **12/4/**  | Three-term Controller (PID) |  |  |
| 25 | **19/4/**  | Three-term Controller (PID) |  |  |
| 26 | **26/4/**  | State equation for dynamic system (electrical system) |  |  |
| 27 | **3/5/**  | Solving state equations |  |  |
| 28 | **10/5/**  | Analogue Computer Simulation |  |  |
| 29 | **17/5/**  | Analogue Computer Simulation |  |  |
| 30 | **24/5/**  | Nonlinear Control System |  |  |

**INSTRUCTOR Signature: Dean Signature:**