

## Course Description Form

| 1. Course Name:                                                                                     |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
|-----------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------|
| Industrial Engineering Management                                                                   |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 2. Course Code:                                                                                     |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| MPAC404                                                                                             |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 3. Semester / Year:                                                                                 |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| yearly(2025–2026)                                                                                   |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 4. Description Preparation Date:                                                                    |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| The beginning of the academic calendar for the year (2025–2026)                                     |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 5. Available Attendance Forms:                                                                      |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| Weekly / theoretical and practical                                                                  |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 6. Number of Credit Hours (Total) / Number of Units (Total)                                         |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 60 hours / 4 units                                                                                  |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 7. Course administrator's name (mention all, if more than one name)                                 |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| Name: Hussein S. Ketan<br>Email: <a href="mailto:hussain.kt@uowa.edu.iq">hussain.kt@uowa.edu.iq</a> |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| 8. Course Objectives                                                                                |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| Course Objectives                                                                                   |                              |                                                                          | 1. Identification of the types and components of control systems.<br>2. Capacity to represent electrical and mechanical systems in the form of circuits of control<br>3. Analysis of the exit signal from the control systems. |                         |                   |
| 9. Teaching and Learning Strategies                                                                 |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| Strategy                                                                                            |                              | 1. Lectures.<br>2. Use of blackboard and telephones.<br>3. Computer use. |                                                                                                                                                                                                                                |                         |                   |
| 10. Course Structure                                                                                |                              |                                                                          |                                                                                                                                                                                                                                |                         |                   |
| Week                                                                                                | Hours                        | Required Learning Outcomes                                               | Unit or subject name                                                                                                                                                                                                           | Learning method         | Evaluation method |
| 1st week                                                                                            | 2 Theoretical + 2 practical. | The student understands the subject                                      | Introduction to Control Systems, Open and Closed Systems.                                                                                                                                                                      | Theoretical + practical | quiz              |

|           |                             |                                     |                                                                                                              |                         |      |
|-----------|-----------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------|------|
| 2nd week  | 2 Theoretical + 2 practical | The student understands the subject | Introduction to Control Systems, Open and Closed Systems.                                                    | Theoretical + practical | quiz |
| 3rd week  | 2 Theoretical + 2 practical | The student understands the subject | Mathematical Modeling of Physical Systems and Transfer Functions, Mathematical Modeling of D.C. Servo Motor. | Theoretical + practical | quiz |
| 4th week  | 2 Theoretical + 2 practical | The student understands the subject | Mathematical Modeling of Physical Systems and Transfer Functions, Mathematical Modeling of D.C. Servo Motor. | Theoretical + practical | quiz |
| 5th week  | 2 Theoretical + 2 practical | The student understands the subject | Mathematical Modeling of Physical Systems and Transfer Functions, Mathematical Modeling of D.C. Servo Motor. | Theoretical + practical | quiz |
| 6th week  | 2 Theoretical + 2 practical | The student understands the subject | Mathematical Modeling of Physical Systems and Transfer Functions, Mathematical Modeling of D.C. Servo Motor. | Theoretical + practical | quiz |
| 7th week  | 2 Theoretical + 2 practical | The student understands the subject | Block Diagrams.                                                                                              | Theoretical + practical | quiz |
| 8th week  | 2 Theoretical + 2 practical | The student understands the subject | Block Diagrams.                                                                                              | Theoretical + practical | quiz |
| 9th week  | 2 Theoretical + 2 practical | The student understands the subject | Time Domain Analysis of Closed Loop Control Systems and Error Analysis.                                      | Theoretical + practical | quiz |
| 10th week | 2 Theoretical + 2 practical | The student understands the subject | Time Domain Analysis of Closed Loop Control                                                                  | Theoretical + practical | quiz |

|           |                             |                                     |                                                    |                         |      |
|-----------|-----------------------------|-------------------------------------|----------------------------------------------------|-------------------------|------|
|           |                             |                                     | Systems and Error Analysis.                        |                         |      |
| 11th week | 2 Theoretical + 2 practical | The student understands the subject | P, PI, PD, and PID                                 | Theoretical + practical | quiz |
| 12th week | 2 Theoretical + 2 practical | The student understands the subject | Modes of Feedback                                  | Theoretical + practical | quiz |
| 13th week | 2 Theoretical + 2 practical | The student understands the subject | Control, Realization of                            | Theoretical + practical | quiz |
| 14th week | 2 Theoretical + 2 practical | The student understands the subject | PID Controller Using Active and Passive Elements.  | Theoretical + practical | quiz |
| 15th week | 2 Theoretical + 2 practical | The student understands the subject |                                                    | Theoretical + practical | quiz |
| 16th week | 2 Theoretical + 2 practical | The student understands the subject | P, PI, PD, and PID                                 | Theoretical + practical | quiz |
| 17th week | 2 Theoretical + 2 practical | The student understands the subject | Modes of Feedback                                  | Theoretical + practical | quiz |
| 18th week | 2 Theoretical + 2 practical | The student understands the subject | Control, Realization of                            | Theoretical + practical | quiz |
| 19th week | 2 Theoretical + 2 practical | The student understands the subject | PID Controller Using Active and Passive Elements.  | Theoretical + practical | quiz |
| 20th week | 2 Theoretical + 2 practical | The student understands the subject | Stability Analysis and Rouths Stability Criterion. | Theoretical + practical | quiz |
| 21st week | 2 Theoretical + 2 practical | The student understands the subject | Stability Analysis and Rouths Stability Criterion. | Theoretical + practical | quiz |
| 22nd week | 2 Theoretical + 2 practical | The student understands the subject | Root Locus Technique.                              | Theoretical + practical | quiz |
| 23rd week | 2 Theoretical + 2 practical | The student understands the subject | Root Locus Technique.                              | Theoretical + practical | quiz |
| 24th week | 2 Theoretical + 2 practical | The student understands the subject | Analysis of Control                                | Theoretical + practical | quiz |
| 25th week | 2 Theoretical + 2 practical | The student understands the subject | System in Frequency Domain and Bode Diagrams.      | Theoretical + practical | quiz |
| 26th week | 2 Theoretical + 2 practical | The student understands the subject | Analysis of Control                                | Theoretical + practical | quiz |
| 27th week | 2 Theoretical + 2 practical | The student understands the subject | System in Frequency Domain and                     | Theoretical + practical | quiz |

|           |                             |                                     |                                            |                         |      |
|-----------|-----------------------------|-------------------------------------|--------------------------------------------|-------------------------|------|
|           |                             |                                     | Bode Diagrams.                             |                         |      |
| 28th week | 2 Theoretical + 2 practical | The student understands the subject | Control System Design Using Bode Diagrams. | Theoretical + practical | quiz |
| 29th week | 2 Theoretical + 2 practical | The student understands the subject | Control System Design Using Bode Diagrams. | Theoretical + practical | quiz |
| 30th week | 2 Theoretical + 2 practical | The student understands the subject | Definitions of Non Linear Systems.         | Theoretical + practical | quiz |

## 11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

## 12. Learning and Teaching Resources

|                                                                    |                                                                                                                                                     |  |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Required textbooks (curricular books, if any)                      | K. Warwick, An Introduction to Control Systems, 2nd ed., vol. 8                                                                                     |  |
| Main references (sources)                                          | K. Ogata, Modern Control Engineering, 3rd e Upper Saddle River, NJ 07458: PrenticeHall, Inc. , 1997 .                                               |  |
| Recommended books and references (scientific journals, reports...) | Problems and solutions of cotrol systems by A. K. Jairath.                                                                                          |  |
| Electronic References, Websites                                    | <a href="https://highperformancehvac.com/control-circuits-for-hvac-systems/">https://highperformancehvac.com/control-circuits-for-hvac-systems/</a> |  |
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استاذ المادة : د. حسين سالم

التاريخ : 2025-08-31



أ.م.د. حسين هادي حسين  
عميد كلية الهندسة



رئيس القسم

أ.م.د محمد حسن عبود

التاريخ: 2025-08-31