**Course description form**

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| 1. Course Name: Control II
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| 1. Course Code: WBM-52-04
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| 1. Semester/Year: Second/2023-2024
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| 1. Date this description was prepared: 03/20/2024
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| 1. Available forms of attendance: Weekly attendance - theoretical hall + practical laboratory
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| 1. Number of study hours (total)/number of units (total): 90 hours/semester (3 theoretical hours per week + 3 practical hours)/3 units
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| 1. Name of the course administrator (if more than one name is mentioned)
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| the name: Asst. Lecturer Harith Nawfal Abdali Al-MusawiEmail:harith.na@uowa.edu.iq‘ |
| 1. Course objectives
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| * Building the student scientifically and qualifying him to understand the applications of digital control in some scientific and engineering fields, especially electrical and mechanical applications.
* Building and preparing the student psychologically to play his role as a reliable engineer in this field.
* Urging the student to be creative and think about specialization projects and keep pace with the development taking place in this field in terms of the basis of digital control in engineering work systems.
* Identify the types of digital control and some of their practical applications
 | **Objectives of the study subject** |
| 1. **Teaching and learning strategies**
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| 1-The methodical book, as well as lectures and solving mathematical problems.2-Scientific library.3- Visual presentation methods (data show) using the PowerPoint program or displaying PDF files to clarify the lecture items, drawings and shapes.4-Useful educational sites on the Internet.5The teacher delivers detailed theoretical lectures, and students participate during the lecture in solving some engineering problems.6- Adopting the homework method to solve the exercises by students.7- The teacher is familiar with the basic concepts of engineering control techniques and their scientific applications, which enhances the method of learning and teaching. | **strategy** |
| 1. **Course structure**
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| **the week** | **hours** | **Required learning outcomes** | **Name of the unit or topic** | **Learning method**  | **Evaluation method**  |
| 1-2 | 6 | Introduction to digital engineering control systems and methods of representing systems | Introduction to Discrete-Time Control System. Review of MathematicalFoundation. | Lectures DATA SHOW | Surprise exams and classroom activities |
| 3-4 | 6 | Analysis of digital control systems and design of a traditional digital controller | Analysis of Discrete-Time Systems. Design of Conventional Discrete-Time Controllers. | Lectures DATA SHOW | Surprise exams and classroom activities |
| 5-6 | 6 | Introduction to theory state space | State-space modeling | Lectures DATA SHOW | Surprise exams and classroom activities |
| 7-8 | 6 | How to analyze using the method (controllability and observability) | controllability and observability | Lectures DATA SHOW | Surprise exams and classroom activities |
| 9-10 | 6 | the definition, z-transform And analysis methods | Sampling theoremZ-transform | Lectures DATA SHOW | Surprise exams and classroom activities |
| 11-12 | 6 | How to design a digital controller using state-space methods | Design of digital control systems using state-space methods | Lectures DATA SHOW | Surprise exams and classroom activities |
| 13-14 | 6 | Recognitiondigital PID controllers  | Digital PID controllers and tuning | Lectures DATA SHOW | Surprise exams and classroom activities |
| 1. Course evaluation
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| Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.* Attendance + cup = 10%
* Monthly exam = 30%
* Practical laboratory = 10%
* Final exam = 50%
* Final total = 100%
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| 1. Learning and teaching resources
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| Required prescribed books |  1.Modern Control Engineering, (5th Edition) By: Katsuhiko Ogata. Mechanical Engineering, University of Minnesota |
| Main references (sources) | 2.Control Systems Engineering, (6th Edition) By: Norman S. Nise. Electrical and Computer Engineering Department at California State Polytechnic University |
| Recommended books and references (Scientific journals, reports,) | -Internet files.-All solid scientific journals and sites that are related to the broad concept of engineering control |
| Electronic references, Internet sites... | tracking Scientific websites to view recent developments in the prescribed subject For fifth year students. |

