

## Course description form

### Course description

This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the opportunities. Learning Available. It must be linked to the program description.

1. Educational institution	University of Warith Al-Anbiyaa, peace be upon him-College of Engineering
2. The sections scientific/ Center	Biomedical engineering
3. Course name/code	Control II
4. Available attendance forms	Presence weekly-Theoretical hall+Laboratory for practical
5. Semester/year	Second / 2024-2025
6. Number of study hours (total)	90 hour/the Season Academic (3 My theoretical hours weekly +3 working hours)
7. Date this description was prepared	2025/03/20
8. Course objectives	
	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
9. The outputs of the Established Teaching, learning and evaluation methods	

### **A- NoCognitive goals**

- 1- Student understanding and educationGeneral problem solving approach starting fromAnalyzing the problem mathematically related to engineering sciences and everything related to it from a scientific perspective.
- 2- Enabling students to gain knowledge and understanding in working onAnalysis ADigital control system.
- 3-Enabling students to obtain knowledge and understanding to diagnose appropriate engineering methods to solve issues related to control and analysis of digital control systems and keep pace with scientific development.
- 4- Students' knowledge of the course he The basis for understandingApplying digital engineering control methods and their uses in our practical and home lives.

### **B -ObjectivesSkillsYehForEstablished.**

- 1 - Explanation of topicsEngineering control Digital with an emphasis on the use of mathematics, including engineering analyses, using digital analyzes as a basis for understanding and learning.
- 2 -It provides them with the skills of how to recognize the types of control systems and their practical applications in daily life and how to use some methods to analyze them engineeringly. And in its own ways.
- 3 -Providing them with the skills of how to design some digital control systems, such as electrical and mechanical systems
- 4-Providing them with the skills of how to transform unstable digital control systems into stable control systems by operating them using some engineering methods.

### **Teaching and learning methods**

- 1- Methodical book Andlike thatLectures And solve mathematical problems.
- 2- the libraryScientific.
- 3- Visual means of presentation(data show) Using PowerPoint or viewing PDF files.To clarify lecture vocabulary, drawings and shapes.
- 4- Useful educational sites on the Internet.
- 5- TeachingBy throwingDetailed theoretical lecturesDuring the lecture, students participate in solving some engineering problems.
- 6- Adopting the homework method to solve exercises by students.
- 7-TeachingWith familiarityWith basic concepts of techniquesEngineering controlAnd its applicationsMWhich enhances the method of learning and teaching.

### **Evaluation methods**

- 1- Surprise written tests and surprise discussions.

- 2- Homework The extent of interaction in laboratory experiments, as well as attendance.
- 3- Quarterly exams.
- 4- final exams.

**C-Emotional and value goals**

- 1- Leading human resources in accordance with professional and ethical standards
- 2-Urging students to work hard and consider themselves future leaders.
- 3-Urge the student to think about Solve engineering problems mathematically and in a logical and systematic analytical manner
- 4-Urge the student to think about using Engineering control systems Its properties and applications in particular Roads Modern ones.
- 5-Harnessing the student's energies to make him aware and work diligently and proficiently in his specialty.

**D - General skills fQualification Transferable (other skills related to employability and personal development).**

- 1- Leading human resources in accordance with professional and ethical standards.
- 2- Raising graduates on the principles of moral and financial integrity.
- 3- Enhancing confidence in one's own mental abilities and acquiring skills in solving scientific problems.

**Course structure .10**

the week	hours	Required learning outcomes	Name of the unit/topic	Teaching 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 Mathematical Foundation.	Lectures DA TA 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 DA TA SHOW	Surprise exams and classroom activities
5-6	6	Introduction to theory statespace	State-space modeling	Lectures DA TA SHOW	Surprise exams and classroom activities

7-8	6	How to analyze using the method (controllability and observability)	controllability and observability	Lectures DA TA SHOW	Surprise exams and classroom activities
9-10	6	the definition, z-transform And analysis methods	Sampling theorem Z-transform	Lectures DA TA 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 DA TA SHOW	Surprise exams and classroom activities
13-14	6	Recognition digital PID controllers	Digital PID controllers and tuning	Lectures DA TA SHOW	Surprise exams and classroom activities

### 11. Infrastructure

1- Required prescribed books	1.Modern Control Engineering, (5th Edition) By: Katsuhiko Ogata. Mechanical Engineering, University of Minnesota
2- 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
B - Electronic references, Internet sites...	tracking Scientific websites to view recent developments in the prescribed subject For fifth year students.


### 12. Course development plan

Searching for new scientific sources to keep pace with modern global development in the field of digital engineering control and development The curriculum is to keep pace with international university curricula.

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**Teacher name: Asst. Lec. Qaysar Iyad**

**the signature:**

A handwritten signature in blue ink, appearing to be 'Q. Iyad', written over a light blue vertical rectangular background.

**Date: 3/20/2025**

**Email : qayssar.ayad@uowa.edu.iq**