Philadelphia University
Mechatronics Engineering Department
Faculty of Engineering and Technology

Course Syllabus	
Course Title	Digital Control
Course Number	0640441
Instructor	Dr. Ahmad Jobran Al-Mahasneh
Email	amahasneh@philadelphia.edu.jo
Website	https://www.philadelphia.edu.jo/academics/amahasneh/
Prerequisites	Automatic Control; Microcontroller Systems
Text Book	Microcontroller Based Applied Digital Control by Dogan Ibrahim, Wiley, 2006.
References	1- Discrete-time control systems Katsuhiko Ogata 2nd edition. 2- Digital Control Engineering Analysis and Design, Second Edition, by M. Sami Fadali and Antonio Visioli, 2013. 3- Digital Control of Dynamic Systems by Franklin, Powel, and Workman, 3rd edition. Addison-Wesley Publisher, 1997. 4- Digital Control Systems: Design, Identification, and Implementation by Landau and Zito. Springer, 2006.

Course Description:

This course provides the students with the needed background for analyzing, designing, and implementing digital controllers. Emphasize will be given to real-time control of mechatronic systems.

Course Objectives:

- Analyze and solve mathematical problems related to digital control theory.
- Understand the basic concepts of digital control theory.
- Analyze the response of closed-loop systems.
- Design digital controllers.
- Program and simulate digital controllers using MATLAB.
- Program digital controller algorithms using microcontrollers.

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	Understand fundamentals of discrete-data systems by applying principles of engineering and mathematics.	[1]
2.	Study the discrete-time system operation based on Z-transform.	[1]
3.	Design and analyse digital control systems for different engineering applications using MATLAB.	[6]

Assessment Instruments

Evaluation of students' performance (final grade) will be based on the following three categories:

- **Mid Exam:** Mid exam will cover the first half of the material.

- **Homeworks and quizzes:** two homeworks and quizzes before and after the mid exam. Quizzes will cover the material discussed during the previous lectures.
- **Final Exam**: The final exam will cover all the class material.

Allocation of Marks	
Mid exam	30%
Homework and quizzes	30%
Final Exam	40%

Attendance policy:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.