Form: Course Syllabus		
	Form Number	EXC-01-02-02A
	Issue Number and Date	2/3/24/2022/2963 05/12/2022
	Number and Date of Revision or Modification	
	Deans Council Approval Decision Number	2/3/24/2023
	The Date of the Deans Council Approval Decision	23/01/2023
	Number of Pages	06

1.	**Course Title**	Automatic Control
2.	**Course Number**	0908382
3.	**Credit Hours (Theory, Practical)**	3 Hours. Theoretical
	Contact Hours (Theory, Practical)	3 Hours weekly
4.	**Prerequisites/ Corequisites**	System Dynamics, Modeling and simulation.
5.	**Program Title**	Bachelor's Degree
6.	**Program Code**	08
7.	**School/ Center**	School of Engineering
8.	**Department**	Mechatronics Engineering
9.	**Course Level**	3rd Year
10.	**Year of Study and Semester (s)**	2023/2024 2nd semester
11.	**Other Department(s) Involved in Teaching the Course**	
12.	**Main Learning Language**	English.
13.	**Learning Types**	■Face to face learning ☐Blended ☐Fully online
14.	**Online Platforms(s)**	■Moodle ■Microsoft Teams
15.	**Issuing Date**	21/2/2024
16.	**Revision Date**	21/2/2024

17. Course Coordinator:

Name: Eng. Samer Salah	Contact hours: Sun, Tue & Thu 11:30-12:30
Office number:2B	Phone number: None
Email: samer.salah@ju.edu.jo	

18. Other Instructors:

Name:
Office number:
Phone number:
Email:
Contact hours:
Name:
Office number:
Phone number:
Email:
Contact hours:

19. Course Description:

Introduction to Control Systems, Stability of Linear Control Systems, Time Domain Analysis of Control Systems, Root Locus Analysis, Compensator Design Using Root Locus Method, Frequency Domain Analysis, Bode Plot Diagram, Compensator Design using Bode Plot Method, PID Controller tuning, MATLAB Control Toolbox.

20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3. An ability to communicate effectively with a range of audiences.

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

21. Course Intended Learning Outcomes: (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

1. Understand the basic definitions related to Control Systems, classifications of control systems, and their objectives, Know the basic components of control systems, and the advantages of closed loop control systems over open loop control systems.
2. Understand the definition of stability of control systems.
3. Differentiate between the absolute and relative stability concepts.
4. Study the absolute stability of control systems using the Routh-Hurwitz criteria.
5. Use the Routh-Hurwitz criteria for the analysis and design of control systems.
6. Find the steady state errors of stable unity feedback control systems.
7. Determine the error constants and the steady state error for certain input.
8. Understand the basic steps of drawing the root locus of control systems.
9. Understand the effect of addition of poles and/or zeros to the control systems.
10. Design Lead and Lag Compensators using Root locus method to achieve desired transient and steady state performance in time domain.
11. Know and apply different configurations of PID controllers, design of PID controller using Open loop tuning methods and closed loop tuning methods.
12. Design of PID controller using.
13. Use MATLAB in the analysis and design of control systems.

Course ILOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	√	√				
2		√				
3		√		√		
4		√		√		
5		√		√		√
6				√		
7				√		
8		√				
9		√				
10			√			√
11		√	√			√
12			√			√
13			√	√		√

22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:

Program ILOs / Course ILOs	ILO (1)	ILO (2)	ILO (3)	ILO (4)	ILO (5)	ILO (6)	ILO (7)
1		√					
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12		√					
13							

23. Topic Outline and Schedule:

Week	Lecture	Topic	ILO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous Lecturing	Evaluation Methods	Learning Resources
1	1.1	Ch1-Intrduction to Control Systems(1)	1	F to F	Moodle			
	1.2	Ch1-Intrduction to Control Systems(2)	1	F to F	Moodle			
	1.3	Ch1-Intrduction to Control Systems(3)	1	F to F	Moodle			
2	2.1	Ch1-Intrduction to Control Systems(4)	2	F to F	Moodle			
	2.2	Ch1-Intrduction to Control Systems(5)	2	F to F	Moodle			

	2.3	Ch1-Intrduction to Control Systems(6)	2	F to F	Moodle			
3	3.1	Ch2-Stability Of Linear Systems (1)	2	F to F	Moodle			
	3.2	Ch2-Stability Of Linear Systems (2)	2	F to F	Moodle			
	3.3	Ch2-Stability Of Linear Systems (3)	3	F to F	Moodle			
4	4.1	Ch2-Stability Of Linear Systems (4)	4	F to F	Moodle			
	4.2	Ch2-Stability Of Linear Systems (5)	4	F to F	Moodle			
	4.3	Ch2-Stability Of Linear Systems (6)	5	F to F	Moodle			
5	5.1	Ch3-Steady State Error (1)	6	F to F	Moodle			
	5.2	Ch3-Steady State Error (2)	6	F to F	Moodle			
	5.3	Ch3-Steady State Error (3)	6	F to F	Moodle			
6	6.1	Ch3-Steady State Error (4)	7	F to F	Moodle			
	6.2	Ch3-Steady State Error (5)	7	F to F	Moodle			
	6.3	Ch3-Steady State Error (6)	7	F to F	Moodle			
7	7.1	Ch4-Root Locus Analysis (1)	8	F to F	Moodle			
	7.2	Ch4-Root Locus Analysis (2)	8	F to F	Moodle			
	7.3	Ch4-Root Locus Analysis (3)	8	F to F	Moodle			
8	8.1	Ch4-Root Locus Analysis (4)	8	F to F	Moodle			
	8.2	Ch4-Root Locus Analysis (5)	8	F to F	Moodle			
	8.3	Ch4-Root Locus Analysis (6)	8	F to F	Moodle			
9	9.1	Ch4-Root Locus Analysis (7)	9	F to F	Moodle			
	9.2	Ch4-Root Locus Analysis (8)	9	F to F	Moodle			
	9.3	Ch4-Root Locus Analysis (9)	9	F to F	Moodle			
10	10.1	Ch5- Design Using Root Locus (1)	9	F to F	Moodle			
	10.2	Ch5- Design Using Root Locus (2)	9	F to F	Moodle			
	10.3	Ch5- Design Using Root Locus (3)	9	F to F	Moodle			
11	11.1	Ch5- Design Using Root Locus (4)	9	F to F	Moodle			
	11.2	Ch5- Design Using Root Locus (5)	10	F to F	Moodle			
	11.3	Ch5- Design Using Root Locus (6)	10	F to F	Moodle			
12	12.1	Ch5- Design Using Root Locus (7)	10	F to F	Moodle			
	12.2	Ch5- Design Using Root Locus (8)	10	F to F	Moodle			
	12.3	Ch6 - PID Controller (1)	11	F to F	Moodle			
13	13.1	Ch6 - PID Controller (2)	11	F to F	Moodle			
	13.2	Ch6 - PID Controller (3)	11	F to F	Moodle			
	13.3	Ch6 - PID Controller (4)	12	F to F	Moodle			
14	14.1	Ch6 - PID Controller (5)	12	F to F	Moodle			
	14.2	Ch6 - PID Controller (6)	12	F to F	Moodle			
	14.3	Ch6 - PID Controller (7)	13	F to F	Moodle			
15	15.1	Ch6 - PID Controller (8)	13	F to F	Moodle			
	15.2	Ch6 - PID Controller (9)	13	F to F	Moodle			
	15.3	Ch6 - PID Controller (10)	13	F to F	Moodle			

24. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	ILO/s Linked to the Evaluation activity	Period (Week)	Platform
Quizzes	10	Ch 2	1-13	4th	On campus
Projects	20	Ch 1 – Ch6	1-13	15th	On campus
Midterm Exam	30	Ch 1 – Ch 4	1-7	6th	On campus
Final Exam	50	Ch 4 – Ch 6	8-13	16th	On campus

25. Course Requirements:

Students should have a computer, internet connection, webcam, account on a Mathwork, Matlab Software, textbook and Handouts.

26. Course Policies:

A- Attendance policies:

Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class. The university policy regarding the attendance will be strictly adhered to.

B- Absences from exams and submitting assignments on time:

There will be no makeup exams for any exam that will be taken during the course. exceptions to this rule is restricted only to the following cases: -

- Death of only first order relatives (father, mother, sister, or brother).
- Hospital entry (in-patient) during the time of the examination.

Any other cases will be given the zero mark in the corresponding exam.

C- Health and safety procedures:

None.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Department and college instructions regarding cheating and misappropriation will be applied.

E- Grading policy:

Assessment	Mark
Quizzes	10
Project	10
Midterm exam	30
Final exam	50
Total	100

F- Available university services that support achievement in the course:

Control lab equipment and devices

27. References:

A- Required book(s), assigned reading and audio-visuals:

1. Control Systems Engineering, by Norman S. Nise, 6th Edition, Johm Wiley
2. Modern Control Systems. Richard Drof and Robert Bishop, 12th Edition, Prentice Hall.

B- Recommended books, materials, and media:

1. Modern Control Engineering, Katsuhiko Ogata, 5th Edition n, Prentice Hall.

28. Additional information:

None

Name of the Instructor or the Course Coordinator:	Signature:	Date:
……**Eng.Samer Salah**……	……..……	……..……
Name of the Head of Quality Assurance Committee/ Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Department	Signature:	Date:
…….	……..……	……..……
Name of the Head of Quality Assurance Committee/ School or Center	Signature:	Date:
…….	……..……	……..……
Name of the Dean or the Director	Signature:	Date:
…….	……..……	……..……