



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	08

1.	Course Title	Engineering Mathematics-1
2.	Course Number	0301202
3.	Credit Hours (Theory, Practical)	3
	Contact Hours (Theory, Practical)	3
4.	Prerequisites/ Corequisites	0301201
5.	Program Title	B.S.c.
6.	Program Code	
7.	School/ Center	Science
8.	Department	Mathematics
9.	Course Level	Mandatory College requirement
10.	Year of Study and Semester (s)	2 nd year, all semesters
11.	Other Department(s) Involved in Teaching the Course	
12.	Main Learning Language	
13.	Learning Types	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
14.	Online Platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams
15.	Issuing Date	30/10/2024
16.	Revision Date	30/10/2024

17. Course Coordinator:

Name: Mohammed Al-Horani	Contact hours: Sun, Tue, (10-11) Mon, Wed (11:30-12:30)
Office number: 206	Phone number: 22094
Email: horani@ju.edu.jo	



18. Other Instructors:

Name: Shaher Al-Momani

Office number: 212

Phone number:

Email: s.momani@ju.edu.jo

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19. Course Description:

Classifications, Solutions of differential equations (first order, second order, higher order, and systems), series solutions, Laplace transform method.

20. Program Student Outcomes (SO's):

(To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

1. Identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of Mathematics and Science and/or technical topics to areas relevant to the discipline.
2. Formulate and design a model, process, procedure or program to meet desired needs.
5. Reflect the impact of technical and/or scientific solutions in economic, environmental, and societal contexts.

**21. Course Intended Learning Outcomes (CLO's):**

(Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

- 1- Master the basic concepts of ordinary differential equation (ODE).
- 2- Select a proper procedure to solve a given ODE
- 3- Model applications in Mechanics
- 4- Find series solutions of 2nd order linear differential equations.
- 5- Find the Laplace (and inverse Laplace) transforms of given functions
- 6- Solve IVPs using Laplace transform
- 7- Solve 2x2 linear system of ODEs

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	√	√	√			
2	√	√		√	√	
3		√	√			
4		√			√	
5	√	√	√		√	
6	√	√	√		√	
7	√	√			√	



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

Program SO's Course CLO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)	SO (8)
Master the basic concepts of ordinary differential equation (ODE).	•	•						
Select a proper procedure to solve a given ODE	•	•						
Model applications in Mechanics	•	•			•			
Find series solution of 2nd order linear differential equations.	•	•						
Find the Laplace transforms and the inverse Laplace transforms of given functions	•	•						
Solve IVPs using Laplace transform	•	•						
Solve 2x2 linear system of ODEs	•	•						

23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types (Face to Face(FF)/ Blended(BL)/ Fully Online(FO))	Platform Used	Synchronous / Asynchronous	Evaluation Methods	Learning Resources
1	1.1	Classification of ODEs	1	FF	Teams	S	Exams	Text Book
	1.2	Separable ODEs	2	FF	Teams	S	Exams	Text Book
	1.3	First order linear ODEs	2	FF	Teams	S	Exams	Text Book



2	2.1	Bernoulli ODEs	2	FF	Teams	S	Exams	Text Book
	2.2	Homogeneous first-order ODEs	2	FF	Teams	S	Exams	Text Book
	2.3	Exact ODEs	2	FF	Teams	S	Exams	Text Book
3	3.1	Exact ODEs	2	FF	Teams	S	Exams	Text Book
	3.2	Integrating factors	2	FF	Teams	S	Exams	Text Book
	3.3	Integrating factors	2	FF	Teams	S	Exams	Text Book
4	4.1	Second-Order ODEs: Basic concepts	2	FF	Teams	S	Exams	Text Book
	4.2	Independent Solutions and Wronskian	2	FF	Teams	S	Exams	Text Book
	4.3	x and y missing	2	FF	Teams	S	Exams	Text Book
5	5.1	Reduction of order	2	FF	Teams	S	Exams	Text Book
	5.2	Characteristic equation: distinct and equal roots	2	FF	Teams	S	Exams	Text Book
	5.3	Characteristic equation: complex roots	2	FF	Teams	S	Exams	Text Book
6	6.1	Cauchy-Euler Equations	2	FF	Teams	S	Exams	Text Book
	6.2	Undetermined Coefficients	2	FF	Teams	S	Exams	Text Book
	6.3	Undetermined Coefficients	2	FF	Teams	S	Exams	Text Book
7	7.1	Variation of Parameters	2	FF	Teams	S	Exams	Text Book
	7.2	Modeling (spring)	3	FF	Teams	S	Exams	Text Book
	7.3	Higher-Order Homogeneous ODEs	2	FF	Teams	S	Exams	Text Book
8	8.1	Undetermined Coefficients for Higher-Order ODEs	2	FF	Teams	S	Exams	Text Book
	8.2	Variation of Parameters for Higher-Order ODEs	2	FF	Teams	S	Exams	Text Book
	8.3	Variation of Parameters for Higher-Order ODEs	2	FF	Teams	S	Exams	Text Book
9	9.1	System of linear first-order ODEs-Introduction	7	FF	Teams	S	Exams	Text Book



	9.2	Homogeneous 2x2 linear system-Complex Eigen Values	7	FF	Teams	S	Exams	Text Book
	9.3	Homogeneous 2x2 linear system-Distinct Eigen Values	7	FF	Teams	S	Exams	Text Book
10	10.1	Homogeneous 2x2 linear system-Equal Eigen Values	7	FF	Teams	S	Exams	Text Book
	10.2	Nonhomogenous Linear system-Undetermined Coefficients	7	FF	Teams	S	Exams	Text Book
	10.3	Nonhomogenous Linear system-Undetermined Coefficients	7	FF	Teams	S	Exams	Text Book
11	11.1	Nonhomogenous Linear system-Variation of Parameters	7	FF	Teams	S	Exams	Text Book
	11.2	Review of Power Series	4	FF	Teams	S	Exams	Text Book
	11.3	Power Series Solution about Ordinary Points	4	FF	Teams	S	Exams	Text Book
12	12.1	Power Series Solution about Ordinary Points	4	FF	Teams	S	Exams	Text Book
	12.2	Regular Singular Points (classification)	4	FF	Teams	S	Exams	Text Book
	12.3	Solutions about regular singular points	4	FF	Teams	S	Exams	Text Book
13	13.1	Solutions about regular singular points	4	FF	Teams	S	Exams	Text Book
	13.2	Laplace Transform-Definitions and basic concepts	5	FF	Teams	S	Exams	Text Book
	13.3	Inverse Laplace Transform	5	FF	Teams	S	Exams	Text Book
14	14.1	Inverse Laplace Transform	5	FF	Teams	S	Exams	Text Book
	14.2	Unit Step Function	5	FF	Teams	S	Exams	Text Book
	14.3	Dirac's Delta Function	5	FF	Teams	S	Exams	Text Book
15	15.1	Transforms of derivatives and integrals	5	FF	Teams	S	Exams	Text Book
	15.2	Solutions(using Laplace) of linear ODEs	6	FF	Teams	S	Exams	Text Book
	15.3	Solutions(using Laplace) of system of 2x2 linear ODEs	6	FF	Teams	S	Exams	Text Book

**24. Evaluation Methods:**

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

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
First Exam	20	Chap 1+2	1,2	7 th weak	On campus
Mid Term	30	Chap 3 +4	1,2,5	11 th weak	On campus
Final Exam	50	Chap 1-6	1,2,5	16 th weak	On campus

25. Course Requirements:

Each student must have:

- Computer
- Account on Microsoft Teams

26. Course Policies:

Class attendance of students at the beginning of the lecture is recoded.
 Assignment is given to the students at regular intervals for them to solve and submit.
 Late or no submission of assignments carries penalties or loss of grade points.
 Absences recorded in each lecture with making excuses, if any.
 Exiting during the lecture since Formal justification or excuse forces.
 Mobile phone use in the classroom is Forbidden.

**27. References:**

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

Advanced Engineering Mathematics, E. Kreyszig, 10th edition.

B- Recommended books, materials, and media:

1) Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, 5th edition.

2) Advanced Engineering Mathematics, K. A. Stroud and Dexter J. Booth, 5th edition

28. Additional information:

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Name of the Instructor or the Course Coordinator: Prof. Mohammed Al-Horani	Signature:	Date: 03-10-2024
Name of the Head of Quality Assurance Committee/ Department: Prof. Manal Ghanem	Signature:	Date:
Name of the Head of Department: Prof. Baha Alzalg	Signature:	Date:
Name of the Head of Quality Assurance Committee/ School of Science: Prof. Emad A. Abuosba	Signature:	Date:
Name of the Dean or the Director: Prof. Mahmoud I. Jaghoub	Signature:	Date: