



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:
Applied Mathematics (I)

1	Course title	Applied Mathematics (I)
2	Course number	0301701
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/requisites	none
5	Program title	Masters in Mathematics
6	Program code	
7	Awarding institution	The University of Jordan
8	Faculty	Science
9	Department	Mathematics
10	Level of course	Elective specialization requirement
11	Year of study and semester (s)	First year
12	Final Qualification	Master in Mathematics
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	21/10/2020

16. Course Coordinator:

Name: Dr. Iryna Komashynska
Office number:22100
Phone number:
Email:
i.kom@ju.edu.jo

17. Other instructors:

None

18. Course Description:

Review of ODEs, existence and uniqueness of solutions for ODEs, Integral Transforms, Green's Function, Approximation Methods, non-linear ODEs and their stability.

19. Course aims and outcomes:

A- Aims:

- 1- To solve linear and nonlinear ordinary differential equations (ODEs)
- 2- To study the existence and uniqueness of solutions to the initial value problem
- 3- To discuss the stability for some linear and nonlinear systems
- 4- To apply perturbation methods

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...**B- Intended Learning Outcomes (ILOs):**

Upon successful completion of this course, students will be able to:
Successful completion of the course should lead to the following outcomes:

A. Knowledge and Understanding Skills: Student is expected to

- A1) be familiar with the basic concepts of ordinary differential equations .
- A2) Select proper procedure to solve a given ODE.

B. Intellectual Analytical and Cognitive Skills: Student is expected to

- B1) analyze the stability of the nonlinear system
- B2) Find, if possible, the Green's function

Subject- Specific Skills: Student is expected to

- C1) Solve ODEs and a system of linear ODEs
- C2) Solve boundary value problems using Green's functions
- C3) apply regular and singular perturbation methods

D. Creativity /Transferable Key Skills/Evaluation: Student is expected to

- D1) Be involved in the process of illustrating concepts and exploring facts.
- D2) Make critical comments on obtained results
- D3) Write reports, to be involved in general discussions with his class mates, and to do independent work.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Review of ODEs. The existence and uniqueness theorem	1+2		A1,C1		1,2
Further properties of linear differential equations. .Reduction of order. Factorization of operators. Some variable changes	3+4		A2	Home work 1	2
Perturbation methods. The regular perturbation method. The Poincare-Lindstedt method. The singular perturbation method	5-7		C3	Home work 2	3
Boundary value problems and Green's functions	8-9		B2,C2	Midterm Exam	4
Systems of first order ODEs. Linear systems with constant coefficients.	10-11		C1,A1		1,4
Phase plane :Linear systems. Stability of linear system	12-13		B1		1,2
Almost linear system with applications	14		B1	Home work 3	1,2
Liapunov's second method	15		B1	Final exam	1,2

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

In order to succeed in this course, each student each student need to be an active participant in learning- both in class and out of class.

- Class time will be spent on lecture as well as discussion of homework problems and some groupwork
- To actively participate in class, you need to prepare by reading the textbook and doing all assigned homework before class.
- You should be prepared to discuss your homework.
- You are encouraged to work together with other students and to ask questions and seek help from the professor, both in and out of class

22. Evaluation Methods and Course Requirements:

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

ILO/s	Learning Methods	Evolution Methods	Related ILO/s to the program
	Lectures	Exam	
	Published Papers	Presentation	
		Home work	

23. Course Policies:

Class attendance of students at the beginning of the lecture is recorded.

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.

24. Required equipment:

25. References:

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

- 1. Elementary differential equations and boundary value problem, Boyce W.E.-DiPrima R.C.**
- 2. Introduction to ordinary differential equations, Rabenstein A.L.**
- 3. Applied Mathematics, Logan D.**
- 4. Fundamentals of Differential Equations, Nagle R.**

B- Recommended books, materials, and media:

- (1) Perturbation methods, Nayfeh A.**
- (2) Differential equations with boundary value problems, Zill D., Cullen M.**

26. Additional information:

Name of Course Coordinator : Dr. I. Komasyńska

Signature : ----- Date : -----

Head of curriculum committee/Department : -----

Signature : -----

Head of Department : Dr. Morad Ahmad

Signature : -----

Head of curriculum committee/Faculty : -----

Signature : -----

Dean : Prof. Mahmoud AlJaghoub

Signature : -----

Copy to:

Head of Department
Assistant Dean for Quality Assurance
Course File