



مركز الاعتماد
و ضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:
Ordinary Differential Equations

1	Course title	Ordinary Differential Equations
2	Course number	0301902
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/requisites	0301901
5	Program title	Ph.D. 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)	2 nd year
12	Final Qualification	Ph.D. in Mathematics
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	13/10/2020

16. Course Coordinator:

Name: Dr. Mohammed Al Horani
Office number: 22109
Phone number: 0775612496
Email: horani@ju.edu.jo

17. Other instructors:

None

18. Course Description:

Existence and uniqueness of ordinary equations: first-order ODEs, systems and n-th order ODEs, Poincare-Bendixon theory, stability theory of linear and almost linear systems, periodic solutions and generalized solutions of ordinary differential equations, nonlinear equations and stability, abstract Cauchy problem

19. Course aims and outcomes:**A- Aims:**

- 1- To prove existence and uniqueness of some first-order ODEs
- 2- . To prove existence and uniqueness for systems and n-th order ODEs
- 3- To discuss the stability for some linear and nonlinear systems
- 4- To study the existence and uniqueness of the Abstract Cauchy problem

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) Master the basic concepts of ordinary differential equation (ODE).A2)

Select proper procedure to solve a given ODE.

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

B1) Write down an ODE that represents a given model

B2) Find if possible the Liapunov function

Subject- Specific Skills: Student is expected to

C1) Solve a system of linear ODE's

C2) prove the existence and uniqueness of some first-order ODEs

C3) prove the existence and uniqueness of some higher-order ODEs

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

D1) Be involved in the process of illustrating concepts, building algorithms 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
The method of successive approximations and Lipschitz condition	1+2		1		1
Nonlocal existence of solutions	3		2		1
Systems as vector equations	4		2	Home work 1	1
Existence and uniqueness of solutions to systems	5		3		1
Existence and uniqueness for linear systems	6		4		1
Equations of order n and revision	6+7		5	Home work 2	1
Stability of linear system	8		6	Mid term Exam	2
Almost linear system with applications	9+10		7		2
Liapunov's second method	11+12		8		2
Periodic solutions	13		9		2
Abstract Cauchy problem .	14+15		10	Home work 3	3

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 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.

24. Required equipment:

25. References:

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

1. An introduction to ordinary differential equations,
Earl A. Coddington
2. The Qualitative Theory of Ordinary Differential Equations,
C. Sparrow
3. Semigroups of linear operators and applications to partial differential equations,
A. Pazy

B- Recommended books, materials, and media:

- (1) Elementary differential equations and boundary value problem,
Boyce-Diprima**
- (2) Ordinary differential equations,
M. Greengerg**

26. Additional information:

Name of Course Coordinator : Dr. Mohammed Al Horani 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 : -----

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Assistant Dean for Quality Assurance
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