



مركز الاعتماد  
وإضمان الجودة  
ACCREDITATION & QUALITY ASSURANCE CENTER



**The University of Jordan**

**Accreditation & Quality Assurance Center**

## **Course Syllabus**

**Course Name:**

**Partial Differential Equations**

1	<b>Course title</b>	Partial Differential Equations
2	<b>Course number</b>	0301903
3	<b>Credit hours (theory, practical)</b>	3
	<b>Contact hours (theory, practical)</b>	3
4	<b>Prerequisites/corequisites</b>	None
5	<b>Program title</b>	Ph.D. Mathematics
6	<b>Program code</b>	
7	<b>Awarding institution</b>	Department of Mathematics, University of Jordan
8	<b>Faculty</b>	Science
9	<b>Department</b>	Mathematics
10	<b>Level of course</b>	Ph.D.
11	<b>Year of study and semester (s)</b>	First year, second semester or second year
12	<b>Final Qualification</b>	Ph.D. In Mathematics
13	<b>Other department (s) involved in teaching the course</b>	None
14	<b>Language of Instruction</b>	English
15	<b>Date of production/revision</b>	2016/2017

**16. Course Coordinator:**

Office number: 208  
 office hours: 11-12 sun, Tus,  
 12:30-1:30 Wes.,  
 aalawneh@ju.edu.jo

**17. Other instructors:**

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**18. Course Description:**

First order partial differential equations. Classification of equations and characteristics. Non-Linear stability, variation and other methods, perturbation methods. Asymptotic methods.

**19. Course aims and outcomes:**

**A- Aims:** Understand basic properties of solution of partial differential equations. Derivation of basic method of solution of P.D.E and related theorem. Carry out independent reading and suggest some research problem.

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

- (1) Classify first order P.D.E into linear, semilinear and non-linear.
- (2) Solve first order partial differential.
- (3) Examine the existence and uniqueness questions of solutions.
- (4) Classify initial value problem into characteristic and non-characteristics.
- (5) Find Canonical forms of P.D.E of 2nd order.
- (6) Solve second order P.D.E by characteristics method.
- (7) Carry stability analysis for linear and non-linear partial differential equations.
- (8) Use variation methods for solving initial value problem for 2nd order P.D.E.
- (9) Use perturbation and asymptotic method for solving linear and non-linear partial differential equations.
- (10) Read some research papers or topics in advanced books and write a report about some of them and present it in class.

**20. Topic Outline and Schedule:**

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
1st order P.D.E	4	A. Alawneh	1, 2, 3, 4	1) Exams	1A, 2A, 3B
Classification and characteristic	3	A. Alawneh	4, 5, 6	2) Home-works	1A, 2A, 3B
Non-linear stability	2	A. Alawneh	7	3) presentation and report	1A, 3B
Variation method	2	A. Alawneh	8		1A
Perturbation and Asymptotic methods	2	A. Alawneh	9		1A, 3B, 4B
Presentation	2	A. Alawneh	10		Selected papers

**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 needs 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 group work.
- To actively participate in class, you need to prepare by reading the textbook and doing all assigned homework before class (homework will be assigned each class period, to be discussed the following period).
- You should be prepared to discuss your homework (including presenting your solutions to the class) at each class meeting - your class participation grade will be determined by your participation in this.
- 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	Evaluation Methods	Related ILO/s to the program
	Lectures	Exam	
		Presentation	
		Homework	

**23. Course Policies:**

1. The student is not allowed to take the course and its pre-requisite in the same time.
2. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
3. If a student is absent for more than 10% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
4. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student's ceasing to attend classes.
5. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
6. Solutions for the exams questions and marks will be announced at the webpage of the instructor: <http://eacademic.ju.edu.jo/eabuosba/default.aspx>
7. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homeworks.

**24. Required equipment:**

**25. References:**

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

- (1) E. Zaudrer: Partial differential equations of applied Mathematics, 2nd edition (1989), John-Wily and Sons.
- (2) I. Sneddon: Element of partial differential equations (1985), McGraw-Hill.

B- Recommended books, materials, and media:

- (1) Carrier G., and C. Pearson partial differential equations academic press (1988).
- (2) A. Nayfeh perturbations methods, Wiley (1973).

**26. Additional information:**

Name of Course Coordinator : Dr. Ahmad Alawneh Signature : ----- Date : 28/3/2017

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