



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name:
Method of Applied Mathematics

1	Course title	Method of Applied Mathematics
2	Course number	0301471
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	(Complex Analysis) 0331412
5	Program title	B.Sc. 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)	4 th year
12	Final Qualification	B.Sc. in Mathematics
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	29/3/2017

16. Course Coordinator:

Dr. Banan Maayah
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b.maayah@yahoo.com

17. Other instructors:

Dr. Ahmad Abdullah

18. Course Description:

This course contains three subjects

In first subject we study linear integral equations (Fredholm and Volterra), methods for solving IEs, Reduction FIE to a System of Algebraic Equations, Approximate method, Method of successive approximation and Laplace transform method.

In next subject we study perturbation technique: Gauge function, order symbols, using perturbations find asymptotic solution of algebraic equations, expansions of integrals and duffing partial DE.

Final subject Complex analytic methods and Conformal mapping and harmonic analysis

19. Course aims and outcomes:

A- Aims: The main aim of the course is to prepare undergraduate students with the basic knowledge of linear IE, perturbation technique and conformal mapping and solving PDE using conformal mapping.
B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...
1. Recognize and classify linear integral equations: Fredholm and Volterra IEs.
2. Use different methods to find exact and approximate solutions of Fredholm and Volterra IEs.
3. Use Laplace transform to solve Volterra IEs.
4. Recognize the gauge function and order symbols.
5. Use perturbation method to find approximate solution of algebraic equations.
6. Use perturbation technique to find asymptotic expansion of integrals.
7. Determine the straightforward approximation of Duffing equation for small ϵ .
8. Introduce the notion of complex functions and mapping.
9. Solve Dirichlet problems using harmonic functions under analytic mappings
10. Recognize the conformal mappings and using conformal mappings to solve larger class of boundary value problem.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Integral equations with separable kernels	1+2		1		1
Method of successive approximations	3		2		1
Fredholm Theorems	4		2	Home work 1	1
Laplace transform for solving VIE	5		3	First Exam	1
Gauge function and order symbols	6		4		2
Perturbation method to algebraic equations	6+7		5	Home work 2	2
Perturbation technique to find asymptotic expansion of integrals.	8+9		6	Second Exam	2
The straightforward approximation of Duffing equation	10		7		2
Complex functions and mapping.	11+12		8		3
Solve Simple Dirichlet problems	13		9		3
conformal mappings and boundary value 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 group work
- 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.

When absence from the test provides a formal excuse.

Exiting during the lecture since Formal justification or excuse forces.

Mobile phone use in the classroom is Forbidden.

24. Required equipment:

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25. References:

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

1. Linear Integral Equations, R. P. Kanwal, 1971.
2. Introduction to Perturbation Techniques, A. H. Nayfeh, 1993.
3. Complex Variables and Applications, J. W. Brown & R. V. Churchill, 2009.

B- Recommended books, materials, and media:

1. **Linear and nonlinear integral equations, Abdul-Majid Wazwaz 2011.**
2. **A first course in complex analysis with applications, D. Zill, P. Shanahan 2003.**

26. Additional information:

Name of Course Coordinator: **Banan Suleiman Maayah**

Signature: -----

Date: -----

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

Signature: -----

Head of Department: -----

Signature: -----

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

Signature: -----

Dean: -----

Signature: -----

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Assistant Dean for Quality Assurance
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