



مركز الاعتماد
وإضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER



The University of Jordan

Accreditation & Quality Assurance Center

Course Syllabus

Course Name

0301713 Complex analysis

1	Course title	Complex Analysis
2	Course number	0301713
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	3
4	Prerequisites/corequisites	
5	Program title	M. Sc. In Mathematics
6	Program code	
7	Awarding institution	The University of Jordan
8	Faculty	Science
9	Department	Mathematics
10	Level of course	Compulsory specialization requirement
11	Year of study and semester (s)	1 st year, 2 nd semester
12	Final Qualification	M. Sc. In Mathematics
13	Other department (s) involved in teaching the course	--
14	Language of Instruction	English
15	Date of production/revision	20/10/2020

16. Course Coordinator:

A. Tallafha

17. Other instructors:**Prof. R khalil.****Prof. A. Usef.**

18. Course Description:

Review of complex numbers. Analytic function, Harmonic function. Maximum modulus principle, open mapping theorem. Conformal mapping. Cross ratio, Stereographic projections. Linear fractional transformation. Complex integrals. Zeros of holomorphic functions. Power series and Laurent series. Singularities. Residue and residue theorem. Application of residue theory. Shwartz Lemma. Rouché' theorem. Reflection principle. Dirichlet problem, Mean value property, Poisson formula. Normal Families.

19. Course aims and outcomes:

A- Aims: to understand the topics in the course and to know the most important application of these topics.

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

- B1. To know the difference between analytic and differentiable function.
- B2. To understand the definition of harmonic functions and to be able to use analytic function to determine if a function is harmonic.
- B3. To recognize that the maximum of a non constant analytic function is obtained on the boundary of the region.
- B4. To be able to decide if a function is conformal at a certain point.
- B5. To understand the bilinear fractional transformation and be able to find a bilinear fractional transformation with certain conditions.
- B6. To be able to calculate complex integrals.
- B7. To Know the zeros and properties of holomorphic functions.
- B8. To be able to calculate Laurent series of a given function on a given region.
- B9. To now how to use residue to evaluate improper real integrals.
- B10. To recognize Shwartz Lemma. Rouché' theorem. Reflection principle. Dirichlet problem, Mean value property, Poisson formula. Normal Families.

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
1. Review of complex numbers	1		B1...B10	Homework's and Exams	Alfors and Conway
2. Analytic function, Harmonic function	2		B1	Homework's and Exams	Alfors and Conway
3. Maximum modulus principle, open mapping theorem	3		B2	Homework's and Exams	Alfors and Conway
4. Conformal mapping. Cross ratio, Stereographic projections	4		B3	Homework's and Exams	Alfors and Conway
5. Linear fractional transformation,	5		B4	Homework's and Exams	Alfors and Conway
6. Complex integrals	6		B5	Homework's and Exams	Alfors and Conway
7. Zeros of holomorphic functions.	7,8		B6	Homework's and Exams	Alfors and Conway
8. Power series and Laurent series	9,10		B7	Homework's and Exams	Alfors and Conway
9. Singularities	11		B8	Homework's and Exams	Alfors and Conway
10. Residue and residue theorem	12,13, 14, 15		B9	Homework's and Exams	Alfors and Conway
11. Application of residue theory.			B9	Homework's and Exams	Alfors and Conway
12. Shwartz Lemma			B10	Homework's and Exams	Alfors and Conway
13. Rouche' theorem			B10	Homework's and Exams	Alfors and Conway
14. Reflection principle			B10	Homework's and Exams	Alfors and Conway
15. Dirichlet problem, Mean value property, Poisson formula			B10	Homework's and Exams	Alfors and Conway
16. Normal Families			B10	Homework's and Exams	Alfors and Conway

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 it's 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 homework's.

24. Required equipment:

25. References:

Alfors, L.V. Complex analysis. McGraw-Hill, N. Y, 1979

Conway. Functions of one complex variable 2^{ed} edition. Springer Verlag, N.Y 1978

26. Additional information:

Name of Course Coordinator: Professor Khalil, R. Signature: -----A.Tallafha----- Date: 20/10/2020

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

Head of Department: ----- Signature: -----

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

Dean: ----- -Signature: -----

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Head of Department
Assistant Dean for Quality Assurance
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