هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

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Course Specification

Course Title:	**Complex Analysis**
Course Code:	**476Math-3**
Program:	**B.Sc. of Mathematics**
Department:	**Mathematics**
College:	**Arts and Sciences**
Institution:	**Najran University**
Version:	**1**
Last Revision Date:	**07-05-2023**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	3				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☒	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:	**7/4**				
4. Course general Description This course covers the basic principles of differentiable complex-valued functions of a single complex variable. Topics include the complex number system, DeMoivre's Theorem, analytic functions and their properties, Cauchy-Riemann conditions, exponential, Log, basis, trigonometric and hyperbolic functions of a complex variable; Complex integration and line integrals, Cauchy – Goursat Theorem, Integral Cauchy formulas, Taylor and Laurent Series expansions, Residues theorem and various applications.					
5. Pre-requirements for this course (if any): **Real Analysis(1) (371Math-3)**					
6. Co- requirements for this course (if any): Non					
7. Course Main Objective(s) The main objective of this course is to identify complex number system, Analytic functions and theorems on complex integration.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	3	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	

4.	Tutorial	
5.	Others (specify)	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define the main concepts of complex analysis.	K1	• Lecture • Discussion	• Assignments • Quizzes • Midterm • Final Exam
2.0	Skills			
2.1	Evaluate differentiation and integration of complex functions.	S3	• Lecture • Discussion	• Assignments • Quizzes • Midterm • Final Exam
2.2	Derive the main formulas in complex analysis.	S2		
2.3	Expand the complex functions in series forms.	S3		
3.0	Values, autonomy, and responsibility			
3.1	Work as part of a team and independently.	V1	Homework	Oral Exam Observation Card

C. Course Content

No	List of Topics	Contact Hours
1.	Complex Number: Algebraic, Polar and Exponential Formulas of Complex Number, Geometric Representation (Argand Diagram), De Moivre's Theorem, Roots of complex Numbers.	9
2.	Complex Function: Limits and continuity, Analytical Functions, Cauchy-Riemann equations, harmonic functions, exponential, logarithmic and Complex Exponent, trigonometric and hyperbolic functions.	12
3	Complex and Line Integrals, Cauchy - Goursat Theorem, Cauchy Integral Formulas and its results.	12
4	Representation of Analytical Functions in Series, Taylor and	12

	Laurent Series, Different types of singularities, zeros and poles, Residue Theorem and its applications.	
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Semester Exam1	6-8	20
2.	Assignments	During classes	10
3.	Semester Exam2	11-13	20
4.	Final Exam	18-20	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	محمود كتكت, مبادئ التحليل المركب دار الشروق جدة 2008
Supportive References	James Ward Brown and Ruel V. Churchill; Complex Variables and Applications. 8th Edition, McGraw Hill, Higher Education, 2004.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom with 30 seats.
Technology equipment (projector, smart board, software)	- Blackboard Platform - Projector

Items	Resources
Other equipment (depending on the nature of the specialty)	**N/A**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Student Questionnaire (Indirect)
Effectiveness of students assessment	Peer Reviewer	Rubrics (Indirect)
Quality of learning resources		
The extent to which CLOs have been achieved	Faculty	Direct
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Council of Mathematics Department
REFERENCE NO.	14441017-0208-00014
DATE	17-10-1444H