# Course Specification

(Postgraduate)

| | |
|---|---|
| **Course Title:** | **Complex Analysis** |
| **Course Code:** | **Math629** |
| **Program:** | **Mathematics** |
| **Department:** | **Mathematics** |
| **College:** | **College of Science and Humanities, Alkharj** |
| **Institution:** | **Prince Sattam Bin Abdulaziz University** |
| **Version:** : | **1/2024** |
| **Last Revision Date:** | *Pick Revision Date.* |

## Table of Contents

# A. General information about the course:

## 1. Course Identification:

| 1. Credit hours: (2 hours ) | | | | |
|---|---|---|---|---|
| | | | | |
| **2. Course type** | | | | |
| **A.** | ☐University | ☐College | ☒ Department | ☐Track |
| **B.** | ☒ Required | | ☐Elective | |
| **3. Level/year at which this course is offered: (: 2 (2,2,0))** | | | | |
| **4. Course general Description:** | | | | |
| **Harmonic function, the general form of Cauchy's Theorem, Normal families, Conformal mapping. Analytic continuation, univalent function theory.** | | | | |
| **5. Pre-requirements for this course (if any): None** | | | | |
| | | | | |
| **6. Pre-requirements for this course (if any): None** | | | | |
| | | | | |
| **7. Course Main Objective(s):** | | | | |
| **The main purpose of this course that the students gain better understanding about various concepts of contemporary complex analysis and their applications in solving mathematical problems.** | | | | |

## 2. Teaching Mode: (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | Traditional classroom | 4 hours a week | 100% |
| 2 | E-learning | | |
| 3 | Hybrid<br>• Traditional classroom<br>• E-learning | **E-learning**: In case of suspension of regular classes due to any unforeseen eventualities | Not applicable |
| 4 | Distance learning | | |

### 3. Contact Hours: (based on the academic semester)

| No | Activity | Contact Hours |
|---|---|---|
| 1. | **Lectures** | **32** |
| 2. | **Laboratory/Studio** | |
| 3. | **Field** | |
| 4. | **Tutorial** | **16** |
| 5. | **Others (specify)……** | 16 |
| | **Total** | **64** |

## 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 | Demonstrate a thorough understanding of various theories and concepts of contemporary complex analysis, in particular spaces of analytic functions, quasi-conformal mappings, univalent functions | K1 | 1. Class Room Lectures<br>2.Interactive sessions<br>3.Exclusive Office Hours for clearing doubts in small groups | 1. Two Internal Exams<br>2.At least two Quiz<br>3.End Semester Exam |
| 1.2 | Able to describe the use of complex analysis in other areas of mathematics such as harmonic analysis, differential equations | K2 | | |
| **2.0** | **Skills** | | | |
| 2.1 | Acquire skills to apply various techniques of contemporary complex analysis in solving mathematical problems | S1 | Application oriented exercises during lecture and tutorial session | 1.Homework<br>2.Assignments<br>3.Quiz<br>4.Mid Term and Final Exam |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| 2.2 | Able to participate in discussions | S3 | Group discussion Interactive session | Group Discussion / Assignment |
| **3.0** | **Values, autonomy, and responsibility** | | | |
| 3.1 | Appreciate the contribution of mathematics to the society in various fields. | V1 | Group Discussion during lectures and Interactive Session and Exercises during Lecture and Tutorials | 1.Oral Presentation 2. Continuous assessment 4. Group Assignment |
| 3.2 | Work independently and in groups | | | |

## C. Course Content:

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | Harmonic function. | 6 |
| 2. | The general form of Cauchy's Theorem. | 6 |
| 3. | Normal families. | 6 |
| 4. | Conformal mapping. | 8 |
| 5. | Analytic continuation. | 8 |
| 6. | Univalent function theory | 8 |
| 7. | Revision | 6 |
| **Total** | | **48** |

## D. Students Assessment Activities:

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| 1. | Mid Term Exam I | 6 | 15% |
| 2. | Quiz (At least 2 quiz) | 4 & 10 | 10% |
| 3. | Mid Term Exam II | 13 | 15% |
| 4. | Continuous Assessment – Homework, Assignment, Attendance etc. | -- | 10% |
| 5. | End Semester Exam | 17 | 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** | -Schaum's Outline Series, McGRAW-HILL , Complex Variables with an introduction to CONFORMAL MAPPING and its applications, Second Edition Murray R. Spiegel, Ph.D. Former Professor and Chairman, Mathematics Department Rensselaer Polytechnic Institute, Hartford Graduate Center Seymour Lipschutz, Ph.D. Mathematics Department, Temple University John J. Schiller, Ph.D. Mathematics Department, Temple University Dennis Spellman, Ph.D. Mathematics Department, Temple University<br>- COMPLEX VARIABLES AND APPLICATIONS, SEVENTH EDITION, James Ward Brown, Professor of Mathematics, The University of Michigan-Dearborn-Rue1 V. Churchill, Late Professor of Mathematics, The University of Michigan |
| **Supportive References** | |
| **Electronic Materials** | |
| **Other Learning Materials** | |

## 2. Educational and Research Facilities and Equipment Required:

| Items | Resources |
|---|---|
| **facilities**<br>(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | Classrooms with Smartboards with seating facilities for at least 30 students |
| **Technology equipment**<br>(Projector, smart board, software) | • Smartboard, Internet Connection for Blackboard |
| **Other equipment**<br>(Depending on the nature of the specialty) | |

## F. Assessment of Course Quality:

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| **Effectiveness of teaching** | Students<br>Peer Review/Classroom Observation | Indirect |
| **Effectiveness of students assessment** | Independent member teaching staff | Check marking by an independent member teaching staff of samples of student work. |
| **Quality of learning resources** | Students | Indirect |
| **The extent to which CLOs have been achieved** | Faculty Member | Direct |

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| | Quality Unit of College and department | Learning outcomes assessment. |
| **Other** | | |

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

## G. Specification Approval Data:

| | |
|---|---|
| **COUNCIL /COMMITTEE** | |
| **REFERENCE NO.** | |
| **DATE** | |