**Code and Name:**

**MAT5200 Analytical Functions**

**Unit:**

Institute of Science, Department of Mathematics

**Details:**

* **Term:** 2023-2024 Spring
* **Status:** Elective
* **Class Level:** 1
* **Credit Hours:** 3-0-0-3
* **ECTS:** 6
* **Language:** Turkish

**Course Instructors:**

* **Course Coordinator:** ...
* **Assistant Instructor:** ...
  + **Phone:** ...
  + **Email:** ...@firat.edu.tr
  + **Social Accounts:** ...

**Weekly Schedule**

| **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** | **Saturday** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |

**Teaching Method:**  
Each weekly hour will include at least 45 minutes of face-to-face teaching.

**Location:**

* **In-person (YY):** Classroom (To be announced)
* **Remote (UE):** -

**Objective:**

To explain the fundamental properties and theorems of analytical functions.

**Materials:**

1. S. Saks, A. Zygmund, *Analytic Functions*
2. A. I. Markushevich, *The Theory of Analytical Functions*
3. Rolf Nevanlinna, *Analytic Functions*

**Student Responsibilities:**

Students are required to attend at least 70% of the classes.

**Weekly Lesson Plan:**

| **Week** | **Topic** | **Methodology** |
| --- | --- | --- |
| 1 | Introduction to the course: Goals, content, methods, and resources | Face-to-Face |
| 2 | **Introduction to Analytical Functions**: Continuity and uniform convergence in complex variables | Face-to-Face |
| 3 | **Normal Families of Functions**: Semi-continuity, total differential | Face-to-Face |
| 4 | **Differentiation in Complex Domains**: Cauchy-Riemann equations | Face-to-Face |
| 5 | Exponential and trigonometric functions, argument concept | Face-to-Face |
| 6 | Complex logarithm, tangents to curves | Face-to-Face |
| 7 | Homographic transformations | Face-to-Face |
| 8 | Symmetric transformations | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Regular curves, derivative of integrals concerning a complex variable | Face-to-Face |
| 11 | Cauchy formula in a rectangle | Face-to-Face |
| 12 | Almost uniformly convergent sequences of analytical functions | Face-to-Face |
| 13 | Stieltjes-Osgood theorem | Face-to-Face |
| 14 | Morera theorem | Face-to-Face |

**Assessment and Evaluation:**

| **Method** | **Quantity** | **Weight** |
| --- | --- | --- |
| **Midterm Exam** | 1 | 50% |
| **Quizzes** | None | - |
| **Assignments** | Pre- and post-midterm activities | - |
| **Projects** | None | - |
| **Final Exam** | 1 | 50% |

**Learning Outcomes:**

1. Learn continuity and uniform convergence in complex variables.
2. Understand differentiation in complex domains and Cauchy-Riemann equations.
3. Grasp the concept of argument and complex logarithm.
4. Learn homographic and symmetric transformations.
5. Comprehend the significance of analytical functions.

**Special Notes:**

* **UE:** Remote Education
* **YY:** Face-to-Face Education