**Code and Name:**

**MAT6050 Approximation Theory of 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 teach the direct and inverse theorems of approximation theory for functions that are continuous over an interval and for analytic functions on sets.

**Materials:**

* A.F. Timan, *Theory of Approximation of Functions of a Real Variable*

**Student Responsibilities:**

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

**Weekly Lesson Plan:**

| **Week** | **Topic** | **Methodology** |
| --- | --- | --- |
| 1 | Introduction to the course and key concepts | Face-to-Face |
| 2 | **Chebyshev Theorems and Polynomials**: Properties and applications | Face-to-Face |
| 3 | **Weierstrass Theorems**: Properties and significance | Face-to-Face |
| 4 | Polynomial kernels and continuity modules | Face-to-Face |
| 5 | Functions specified by continuity modules | Face-to-Face |
| 6 | Direct and inverse theorems for approximating periodic functions | Face-to-Face |
| 7 | **Hölder and Zigmund Function Classes**: Definitions and properties | Face-to-Face |
| 8 | Constructive characteristics of Hölder and Zigmund function classes | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Direct and inverse theorems for approximating functions with polynomials | Face-to-Face |
| 11 | Inequalities related to the modulus of polynomial derivatives | Face-to-Face |
| 12 | Constructive characteristics of non-periodic Hölder and Zigmund functions | Face-to-Face |
| 13 | Approximation problems of functions in the complex plane | Face-to-Face |
| 14 | Examples related to function approximation | 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 Chebyshev theorems and polynomials.
2. Understand Weierstrass theorems, polynomial kernels, and continuity modules.
3. Learn about periodic function approximation and Hölder and Zigmund function classes.
4. Understand function approximation with polynomials and the modulus of polynomial derivatives.
5. Learn about non-periodic Hölder and Zigmund function classes.

**Special Notes:**

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