**Code and Name:**

**MAT5870 Complex Manifolds**

**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 theory of complex manifolds.

**Materials:**

1. Kobayashi, S., Nomizo, K., *Foundations of Differential Geometry, Volume II*, 1969
2. Hsiung, C.C., *Almost Complex and Complex Structures*, 1995
3. Yano, K., Kon, M., *Structure on Manifolds*, 1984
4. Huybrechts, D., *Complex Geometry*, 2004

**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 | **Fundamentals of Complex Manifolds**: Complex structures, almost complex structures, complex manifolds | Face-to-Face |
| 3 | Nearly Kähler manifolds: Definitions and theorems | Face-to-Face |
| 4 | Kähler submanifolds | Face-to-Face |
| 5 | Anti-invariant submanifolds of Kähler manifolds | Face-to-Face |
| 6 | Curvatures of anti-invariant submanifolds | Face-to-Face |
| 7 | CR submanifolds of Kähler manifolds | Face-to-Face |
| 8 | Applications related to the topic | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Quasi-Kähler structures | Face-to-Face |
| 11 | Almost semi-Kähler structures | Face-to-Face |
| 12 | Complex Laplacian: Definitions and fundamental theorems | Face-to-Face |
| 13 | Almost complex structures and examples | Face-to-Face |
| 14 | Applications related to the topic | 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 about nearly Kähler manifolds.
2. Define Kähler submanifolds.
3. Understand anti-invariant submanifolds of Kähler manifolds.
4. Define CR submanifolds of Kähler manifolds.
5. Understand complex structures.

**Special Notes:**

* **UE:** Remote Education