**Code and Name:**

**MAT5850 Algebraic Geometry**

**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 introduce the fundamental concepts of algebraic geometry and emphasize key examples.

**Materials:**

1. Igor R. Shafarevich, *Basic Algebraic Geometry 1: Varieties in Projective Space*, Springer, 2nd ed., 1994
2. Robin Hartshorne, *Algebraic Geometry*, Springer, 1997
3. William Fulton, *Algebraic Curves: An Introduction to Algebraic Geometry*, 1969
4. Ernst Kunz, *Introduction to Commutative Algebra*

**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 | **Preparations from Algebra**: Groups and rings | Face-to-Face |
| 3 | Ideals and varieties | Face-to-Face |
| 4 | **Plane Conics and Classifications** | Face-to-Face |
| 5 | Cubics and group operations | Face-to-Face |
| 6 | Curves and their genera with examples | Face-to-Face |
| 7 | **Affine Varieties**: Definitions and examples | Face-to-Face |
| 8 | Hilbert's Nullstellensatz | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Functions on varieties and their properties | Face-to-Face |
| 11 | **Projective Geometry**: Definitions and properties | Face-to-Face |
| 12 | Rational and semi-rational functions | Face-to-Face |
| 13 | Tangent spaces and related theorems | Face-to-Face |
| 14 | Blow-ups and related theorems | 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. Understand groups, rings, ideals, and varieties.
2. Study plane conics and their classifications.
3. Learn cubics and group operations.
4. Understand functions on varieties.
5. Learn rational and semi-rational functions.

**Special Notes:**

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