**Code and Name:**

**MAT5380 Affine Geometric Structures**

**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 students important structures and models in affine geometry.

**Materials:**

1. Katsumi Nomizu & Takeshi Sasaki, *Affine Differential Geometry*, Cambridge University Press, 1994
2. W. Blaschke, *Lectures on Differential Geometry II: Affine Differential Geometry*, Springer, Berlin, 1923
3. H. Hopf, *Differential Geometry in the Large*, Lecture Notes in Mathematics, Springer, 1983
4. B. Su, *Affine Differential Geometry*, Science Press, Beijing, 1983; Gordon and Breach, New York, 1983

**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 | **Affine Geometry Models**: Ruled affine spheres | Face-to-Face |
| 3 | **Affine Geometry Models**: Homogeneous surfaces | Face-to-Face |
| 4 | **Affine Geometry Models**: Equiaffine homogeneous surfaces | Face-to-Face |
| 5 | **Affine Geometry Models**: SL(n, R) and SL(n, R)/SO(n) surfaces | Face-to-Face |
| 6 | **Affine Geometry Models**: Affine spheres with constant curvature | Face-to-Face |
| 7 | **Affine Geometry Models**: Cayley surfaces, convexity, ellipsoids | Face-to-Face |
| 8 | **Affine Geometry Models**: Characterizations of ellipsoids, Minkowski integral formulas | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | **Affine Geometry Models**: Blaschke-Schneider theorem, affine minimal hypersurfaces | Face-to-Face |
| 11 | **Affine-Geometric Structures**: Hypersurfaces | Face-to-Face |
| 12 | **Affine-Geometric Structures**: Affine immersions and applications | Face-to-Face |
| 13 | **Affine-Geometric Structures**: Cartan-Norden theorem, affine locally symmetric hypersurfaces, rigidity theorem, and extensions of Pick-Berwald theorem | Face-to-Face |
| 14 | **Affine-Geometric Structures**: Projective structure, immersions, hypersurfaces in projective space, complex affine geometry | 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 the fundamental models of affine geometry.
2. Learn concepts of hypersurfaces and minimality in affine geometry.
3. Comprehend the key theorems in affine geometry.
4. Gain knowledge of projective structures.
5. Learn the concepts of complex affine geometry.

**Special Notes:**

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