**Code and Name:**

**MAT5940 Isotropic 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 provide an understanding of isotropic geometry, one of the Cayley-Klein geometries, for those working in non-Euclidean spaces.

**Materials:**

1. I.M. Yaglom, *A Simple Non-Euclidean Geometry and Its Physical Basis*, Springer-Verlag, 1979
2. B.A. Rosenfeld, *A History of Non-Euclidean Geometry: Evolution of the Concept of a Geometrical Space*, Springer, 1988
3. H.S.M. Coxeter, *Non-Euclidean Geometry*, 5th ed., University of Toronto Press, 1978
4. H. Sachs, *Ebene Isotrope Geometrie*, Vieweg, Braunschweig, 1987

**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 | **Euclidean Geometry**: Postulates, emergence of non-Euclidean geometries | Face-to-Face |
| 3 | **Plane Geometries**: Cayley-Klein plane geometries | Face-to-Face |
| 4 | **Isotropic Plane Geometry**: History and development | Face-to-Face |
| 5 | Invariants in isotropic plane geometry | Face-to-Face |
| 6 | Concepts of inner product, distance, norm, angle, and vector in isotropic plane geometry | Face-to-Face |
| 7 | Curve concepts and special curves in isotropic plane geometry | Face-to-Face |
| 8 | **3-Dimensional Isotropic Space**: Fundamental concepts | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Curves and surfaces in 3-dimensional isotropic space | Face-to-Face |
| 11 | Types of surfaces in 3-dimensional isotropic space | Face-to-Face |
| 12 | Surfaces of constant curvature in 3-dimensional isotropic space | Face-to-Face |
| 13 | **3-Dimensional Semi-Isotropic Space**: Fundamental concepts | Face-to-Face |
| 14 | Curves and surfaces in 3-dimensional semi-isotropic space | 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 the postulates of Euclidean geometry and gain fundamental knowledge about non-Euclidean geometries.
2. Understand Cayley-Klein plane geometries and metric concepts.
3. Learn the fundamental concepts of isotropic space.
4. Understand the concepts of curves and surfaces in isotropic space.
5. Grasp the classification of surfaces in isotropic space.

**Special Notes:**

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