**Code and Name:**

**MAT5950 Geometry of Lightlike 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 provide knowledge on semi-Euclidean spaces, lightlike manifolds, product manifolds, lightlike hypersurfaces, and their applications.

**Materials:**

* Duggal, Krishan L., and Bayram Sahin, *Differential Geometry of Lightlike Submanifolds*, Springer, 2011

**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 | **Semi-Euclidean Spaces**: Definitions and properties | Face-to-Face |
| 3 | Subspaces of semi-Euclidean spaces | Face-to-Face |
| 4 | Semi-Riemannian manifolds and their submanifolds | Face-to-Face |
| 5 | Product manifolds | Face-to-Face |
| 6 | **Lightlike Manifolds**: Definitions and properties | Face-to-Face |
| 7 | **Lightlike Hypersurfaces**: General concepts | Face-to-Face |
| 8 | Screen conformal hypersurfaces | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Geometric objects reduced on lightlike hypersurfaces | Face-to-Face |
| 11 | **Gauss-Codazzi Equations** for lightlike hypersurfaces | Face-to-Face |
| 12 | Lightlike Einstein hypersurfaces | Face-to-Face |
| 13 | Semi-symmetric hypersurfaces | Face-to-Face |
| 14 | Differential operators on hypersurfaces | 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 semi-Euclidean and Riemannian spaces.
2. Understand semi-Riemannian manifolds and their properties.
3. Gain knowledge of lightlike manifolds and hypersurfaces.
4. Learn the varieties of lightlike hypersurfaces.
5. Understand differential operators on lightlike hypersurfaces.

**Special Notes:**

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