**Code and Name:**

**MAT5280 Surfaces in Lorentz Space**

**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 examine the counterparts of known theories in Riemannian geometry within Lorentzian geometry.

**Materials:**

1. J.K. Beem, P.E. Ehrlich, K.L. Easley, *Global Lorentzian Geometry*, Second Edition, Pure and Applied Mathematics
2. B. O’Neill, *Semi-Riemannian Geometry*, Academic Press, 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 | **Helices in Lorentz Space**: Types of helices | Face-to-Face |
| 3 | **Slant Helices in Lorentz Space**: Characteristics and types | Face-to-Face |
| 4 | **Bertrand Curves in Lorentz Space**: Characteristics and applications | Face-to-Face |
| 5 | **Involute-Evolute Curves**: Structures and properties | Face-to-Face |
| 6 | **New Bertrand Curves**: Types (1,3), (2,3), and (1,2) | Face-to-Face |
| 7 | **New Involute-Evolute Curves**: Theories and applications | Face-to-Face |
| 8 | **Euler’s and Joachimsthal’s Theorems in Lorentz Space**: Expressions and proofs | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | **Lorentz Manifolds**: Properties and theories | Face-to-Face |
| 11 | **Submanifolds of Lorentz Manifolds**: Geometric properties | Face-to-Face |
| 12 | **Hypersurfaces in Lorentz Manifolds**: Types and applications | Face-to-Face |
| 13 | **Spheres in Lorentz Space**: Types of spheres | Face-to-Face |
| 14 | **Surfaces with Constant Curvature**: Fundamental properties | 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. Gain knowledge about Lorentzian geometry.
2. Understand Bertrand curves in Lorentz space.
3. Learn about involute-evolute curves in Lorentz space.
4. Understand helices in Lorentz space.
5. Learn about slant helices in Lorentz space.

**Special Notes:**

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