**Code and Name:**

**MAT5920 Contact 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 teach the general properties of contact structures, including contact manifolds and submanifolds.

**Materials:**

1. Kentaro Yano, Masahiro Kon, *Structures on Manifolds*, World Scientific Pub., 1984
2. B.Y. Chen, *Geometry of Submanifolds*, Marcel Dekker, Inc., 1973
3. S. Kobayashi, K. Nomizu, *Foundations of Differential Geometry, Vol. I*, Interscience Pub., 1963
4. D. Blair, *Riemannian Geometry of Contact and Symplectic Manifolds*, Birkhäuser, 2002
5. *Integral Formulas in Riemannian Geometry*, Marcel Dekker, Inc., 1970

**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 | **Contact Manifolds**: Almost complex and contact structures | Face-to-Face |
| 3 | **Contact Manifolds**: Almost contact manifolds | Face-to-Face |
| 4 | Contact manifolds | Face-to-Face |
| 5 | Torsion tensors of almost contact manifolds | Face-to-Face |
| 6 | Contact distributions | Face-to-Face |
| 7 | **f-Structures**: Definitions and properties on manifolds | Face-to-Face |
| 8 | Normal f-structures and f-frames | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Invariant submanifolds of Sasakian manifolds | Face-to-Face |
| 11 | Anti-invariant submanifolds of Sasakian manifolds | Face-to-Face |
| 12 | Laplacian for affine metrics | Face-to-Face |
| 13 | Contact CR submanifolds | Face-to-Face |
| 14 | Reduced structures on submanifolds | 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 concepts of contact and complex structures, and provide examples.
2. Learn the varieties of contact manifolds.
3. Understand the concept of Sasakian submanifolds.
4. Learn about invariant submanifolds of Sasakian manifolds.
5. Learn about anti-invariant submanifolds of Sasakian manifolds.

**Special Notes:**

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