**Code and Name:**

**MAT5800 Set and Function Theory**

**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 introduce propositions and proof methods, fundamental theorems of set theory, and concepts of relations and functions.

**Materials:**

1. Ömer Akın, *Discrete Mathematics and Applications*
2. K.H. Rosen, *Discrete Mathematics and Its Applications*
3. John Taylor, Rowan Garnier, *Discrete Mathematics: Proofs, Structures, and Applications*
4. W.D. Wallis, *A Beginner's Guide to Discrete Mathematics*
5. Dr. H.R. Bhapkar, Dr. Parikshit N., *Discrete Mathematics*

**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 | **Propositions and Proofs**: Truth tables, logical connectives, tautology, and contradiction | Face-to-Face |
| 3 | Logical equivalence, propositional algebra, and mathematical proofs | Face-to-Face |
| 4 | **Proof Methods**: Direct, indirect, and counterexample proofs | Face-to-Face |
| 5 | Induction methods | Face-to-Face |
| 6 | **Set Theory**: Sets, members, subsets, and set operations | Face-to-Face |
| 7 | Counting techniques, set algebra, and families of sets | Face-to-Face |
| 8 | Cartesian products | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | **Relations and Functions**: Properties of relations, intersections, and unions | Face-to-Face |
| 11 | **Equivalence Relations**: Properties and examples | Face-to-Face |
| 12 | Functions and their properties | Face-to-Face |
| 13 | **Algebraic Structures**: Binary operations and their properties | Face-to-Face |
| 14 | Properties and examples of algebraic structures | 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 propositional logic and proof methods.
2. Understand induction methods.
3. Learn the properties of set theory.
4. Understand relations and functions.
5. Learn algebraic structures.

**Special Notes:**

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