**Code and Name:**

**MAT5170 Set 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 teach the concepts of sets, functions, equivalence relations, and ordered sets.

**Materials:**

* Charles C. Pinter, *Set Theory*

**Student Responsibilities:**

Students are required to attend at least 70% of the classes.

**Weekly Lesson Plan:**

| **Week** | **Topic** | **Methodology** |
| --- | --- | --- |
| 1 | Introduction to the course: Sets, functions, equivalence relations, and ordered sets | Face-to-Face |
| 2 | **Sets**: Classes, sets, structure sentences, class algebra | Face-to-Face |
| 3 | Cartesian product, graphs, generalized union and intersection | Face-to-Face |
| 4 | Sets and functions | Face-to-Face |
| 5 | Properties of composite and inverse functions | Face-to-Face |
| 6 | Direct and inverse images under functions | Face-to-Face |
| 7 | Product of a family of classes, axiom of replacement | Face-to-Face |
| 8 | **Equivalence Relations**: Equivalence relations and partitions, equivalence relations and functions | Face-to-Face |
| 9 | Midterm Exam | Face-to-Face |
| 10 | Cardinal numbers: Properties of infinite cardinal numbers | Face-to-Face |
| 11 | Ordinal numbers: Operations and ordering | Face-to-Face |
| 12 | Construction of ordinals and cardinals | Face-to-Face |
| 13 | Transfinite recursion, ordinal exponentiation | Face-to-Face |
| 14 | Normal forms, epsilon numbers | 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 classes and sets, structure sentences, class algebra, Cartesian products, and graphs.
2. Learn union and intersection operations, sets, functions, and properties of composite and inverse functions.
3. Grasp the properties of uncountable sets and operations on cardinal numbers.
4. Learn the properties of infinite cardinal numbers and operations on ordinal numbers.
5. Understand the construction of ordinals and cardinals, transfinite recursion, and ordinal exponentiation.

**Special Notes:**

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