**Code and Name:**

**MAT5810 Discrete Mathematics**

**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 about groups, permutations, combinations, lattice structures, Boolean algebra, and graph theory.

**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 | **Groups and Semi-Groups**: Families of groups, permutation groups | Face-to-Face |
| 3 | Morphisms and group codes | Face-to-Face |
| 4 | **Combinatorics**: Fundamental counting principles | Face-to-Face |
| 5 | Permutations and combinations | Face-to-Face |
| 6 | **Lattice Structures and Boolean Algebra**: Definitions and properties | Face-to-Face |
| 7 | Boolean algebra and its properties | Face-to-Face |
| 8 | Functions of Boolean algebra | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Minimization of Boolean expressions | Face-to-Face |
| 11 | **Graph Theory**: Definitions and properties of graphs | Face-to-Face |
| 12 | Paths and circuits, graph isomorphism | Face-to-Face |
| 13 | Node coloring, trees, planar graphs | Face-to-Face |
| 14 | **Algorithms and Finite-State Machines**: Definitions, complexity, and applications | 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 groups and their properties.
2. Learn permutations and combinations.
3. Understand lattice structures and Boolean algebra.
4. Learn graph theory.
5. Understand algorithms.

**Special Notes:**

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