**Code and Name:**

**MAT5120 Sequence Spaces and Series**

**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:**

This course aims to provide general knowledge about sequence spaces, series, and some specific sequence spaces.

**Materials:**

* *Sequence Spaces and Series* by P.K. Kamthan and Manjul Gupta

**Student Responsibilities:**

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

**Weekly Lesson Plan:**

| **Week** | **Topic** | **Methodology** |
| --- | --- | --- |
| 1 | **Introduction to the Course**: Objectives, content, key topics, sequences and series | Face-to-Face |
| 2 | **Introduction to Local Convex Spaces**: Adjoint linear transformations | Face-to-Face |
| 3 | **Topology in Sequence Spaces**: Normed spaces, perfect spaces | Face-to-Face |
| 4 | Simple and symmetric sequence spaces | Face-to-Face |
| 5 | Duality in perfect and non-perfect spaces | Face-to-Face |
| 6 | Mackey convergence, types of convergence in sequences | Face-to-Face |
| 7 | Various applications | Face-to-Face |
| 8 | **Series**: Types, sums, positive-term series, alternating series, convergence tests | Face-to-Face |
| 9 | **Midterm Exam** | Face-to-Face |
| 10 | Power series, Taylor expansions, weak and absolute convergence | Face-to-Face |
| 11 | Duals in sequences, K and FK spaces, nuclear sequence spaces | Face-to-Face |
| 12 | Orlicz and modular sequence spaces | Face-to-Face |
| 13 | Lorentz sequence spaces and convergence theorems | Face-to-Face |
| 14 | Examples related to sequence spaces | 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 topological vector spaces and local convex spaces; learn adjoint linear transformations and normed spaces.
2. Grasp the topology of sequence spaces; understand perfect spaces and simple sequence spaces.
3. Learn symmetric sequence spaces and duality concepts.
4. Understand series, their types, and convergence; master weak and absolute convergence.
5. Comprehend duals in sequence spaces, K and FK spaces, nuclear, Orlicz, modular, and Lorentz sequence spaces.

**Special Notes:**

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