Birzeit University
Mathematics Department
SYLLABUS
Second Semester 2023/2024
Instructor: Dr. Ala Talahmeh, atalahmeh@birzeit.edu
Course Code: MATH3341
Title: Mathematical Analysis II

Course Description: In this course, we study basic properties of sequences of functions pointwise and uniform convergence, elementary topology of $\mathbb{R}^n$, connectedness and compactness in $\mathbb{R}^n$, Heine-Borel Theorem, limits of functions, continuity and differentiability in $\mathbb{R}^n$, Riemann integrals in $\mathbb{R}^n$.

Student Learning Outcomes: After completion of the course, the students should be able to:

- Understand and write proofs of theorems.
- Identify the set of mathematical results that lead to the proof of a statement.
- Compose the arguments leading to the proof of a mathematical statement.
- Solve difficult problems using the main theorems.
- Prepare the students for higher-level analysis courses.

Textbook: **Introduction to Analysis,** by William R. Wade, Fourth edition.

Topics to be Covered:

Chapter 7: Infinite Series of Functions

7.1 Uniform Convergence of Sequences (of functions).

Chapter 8: Euclidean Spaces.

8.1: Algebraic Structure.
8.2: Planes and Linear Transformations.
8.3: Topology of $\mathbb{R}^n$.
8.4: Interior, Closure, and Boundary.

Chapter 9: Convergence in $\mathbb{R}^n$.

9.1: Limits of Sequences.
9.2: Heine-Borel Theorem.
9.3: Limits of Functions.
9.4: Continuous Functions.
9.5: Compact Sets.

Chapter 10: Metric Spaces.

10.1: Introduction.

Chapter 11: Differentiability on $\mathbb{R}^n$.

11.1: Partial Derivatives and Partial integrals.
11.2: The Definition of Differentiability.
11.3: Derivatives, Differentials, and Tangent Planes.
11.4: The Chain Rule.
11.5: The Mean Value Theorem.

Chapter 12: Integration on $\mathbb{R}^n$.

12.1: Jordan Regions.
12.2: Riemann Integration on Jordan Regions.
12.3: Iterated Integrals (if time permits).

Grading Policy:

- **50%** Two hour exams. (**Max. 30% Min. 20%**).
- **10%** Quizzes & home works.
- **40%** Final Exam (Comprehensive).