MATH 331 - METRIC SPACES

Semester: Fall 2025

Instructor: Ferit Öztürk; *office: tb260-b; ferit.ozturk@boun*

Course webpage: `feritozturk.github.io/here/f25m331.html`

Assistant: tba; *office: tb121*
PS schedule tba.
office hours: tba.

Exams & Grading:

(30 %) Midterm exam 1	tba
(30 %) Midterm exam 2	tba
(30 %) Final exam	tba
(10 %) Quizzes	

No make-up for midterms unless you have a serious excuse.
Make-up for final exam covers all topics.
A student may take ONLY ONE make-up.

Course Schedule: Tue,Thur @; 15:00-17:00

Textbook: *Metric Spaces: A Companion to Analysis*, R. Magnus; 2022.
available onilne at Springer's website via Boğaziçi University network.

Topics:
Examples of metric spaces, normed spaces; some inequalities (Sec.1.2)
Cantor set (Sec.1.3)
Spaces of sequences, functions (cont, integrable) (Sec.1.4)
Balls; open sets, closed sets (Sec.2.1,2.2)
Continuous, linear mappings; operator norms (Sec.2.3,2.4)
Homeomorphisms; topologies; Mazur-Ulam Theorem (Sec.2.5-7)
Completeness of $\mathbb{R}^n$ and of sequence spaces (Sec.3.1)
Product spaces (Sec.3.2)
Sequential compactness (Sec.4.1)
Compactness (Sec.4.2)
Their equivalence in a metric space (Sec.4.3)
Finite dim normed vector spaces (Sec.4.4)
Arzela-Ascoli Theorem (Sec.4.5)
Denseness (Sec.5.1)
Separability (Sec.5.2)
Weierstrass approximation theorem (Sec.5.3)
Complete spaces. Nested intersection theorem. (Sec.6.1)
Completion (Sec.6.7)
Connected spaces (Sec.7.1)
Connectedness vs continuous mappings (Sec.7.2)
Connected components (Sec.7.3)