Izmir Institute of Technology / Department of Civil Engineering

CE 441 – Concrete Technology

2025-2026 Spring Semester

Instructor:

Dr. Yunus Seyrek

Course Time and Location:

Mondays 08:45-09:30 and 13:30-14:15

CZ17

Course Description:

The objective of this course is to deepen engineering knowledge of the microstructure of concrete, advanced mechanical properties in both fresh and hardened states, and durability mechanisms. Beyond traditional concrete technology, the course explores sustainable low-carbon solutions, alkali-activated binders, and digital production techniques such as 3D concrete printing. It aims to provide students with the skills to perform performance-oriented concrete design and apply innovative technologies in line with the current needs of the modern construction industry.

Textbook and References:

- T.Y. Erdoğan, Materials of Construction, METU Press, 2002.
- Concrete: Structure, Properties and Materials by Mehta and Monteiro, Third Edition, McGraw-Hill, 2006.
- Li, Z., Zhou, X., Ma, H., & Hou, D. (2022). Advanced concrete technology. John Wiley & Sons. Neville, A.M., Brooks, J.J. Concrete Technology (second edition), Prentice Hall, 2010.
- Monteiro, P. (2006). Concrete: microstructure, properties, and materials. McGraw-Hill Publishing.

Grading:

- Midterm: 30%
- Presentations 20%
- Final Exam: 50%

Course Content:

- Engineering Future of Concrete
- Cement Chemistry
- Mineral Admixtures (SCMs)
- Chemical Admixtures

- Microstructure
- Mix Design
- Rheology
- Alternative Binders
- Testing of Concrete
- Durability
- Special Concretes