# İZMİR INSTITUTE OF TECHNOLOGY
## DEPARTMENT OF MECHANICAL ENGINEERING
## ME577 KINEMATIC SYNTHESIS OF MECHANISMS
## SPRING 2024-2025

**COURSE INSTRUCTOR**

Prof. Dr. Gökhan Kiper (Office: Z14, gokhankiper@iyte.edu.tr, 750 6777)

**COURSE ASSISTANT**

Mr. Fırat Kara (Office: Z31 – Mechatronics Laboratory, firatkara@iyte.edu.tr, 750 6752)

**COURSE SCHEDULE**

Monday 09:45 – 12:30   @D5 Classroom

**COURSE CONTENT**

Introduction, kinematic synthesis problems: function / path / motion generation;

Approximation Theory – Interpolation / Least-Squares / Chebyshev Approximation;

Respacing in Approximation; Decomposition / Correction Methods in Function Generation;

Function Generation for 2-dof Mechanisms; Dead-Center Design + Mixed Function Generation

Path Generation - Classical methods; Path Generation with Coupler Curve Equation;

Motion Generation - Dyadic formulation; Motion Generation with Multiple End-Effectors

**REFERENCES**

E. Söylemez, Kinematic Synthesis of Mechanisms: Using Excel and Geogebra, Springer, 2023.

G. N. Sandor & A. G. Erdman, Advanced Mechanism Design: Analysis and Synthesis, Vol. 2, Prentice-Hall, 1984.

J. M. McCarthy & G. S. Soh, Geometric Design of Linkages, 2nd Ed., Springer, 2011.

A. S. Hall, Kinematics and Linkage Design, Prentice-Hall, 1961.

W. Lichtenheldt, Mekanizmaların Konstrüksiyonu (Çeviren: F. Pasin), İTÜ, 1975 (Original 1964)

K. Hain, Applied Kinematics, McGraw-Hill, 2nd Ed., 1967.

R. S. Hartenberg & J. Denavit, Kinematic Synthesis of Linkages, McGraw-Hill, 1964.

C. H., Suh & C. W., Radcliffe, Kinematics and Mechanisms Design, John Wiley & Sons, 1978.

**EXAMINATIONS and ASSIGNMENTS**

You will have weekly or biweekly homework assignments involving formulation and computation.

**TENTATIVE GRADING**

Assignments (%40) + Midterm Examination (%30) + Final Examination (%30)

**ACADEMIC ETHICS**

All written submissions (homework assignments, exams, etc.) must reflect purely independent and individual efforts. All reference material (books, scientific papers, web sites, etc.) in these submissions should be properly cited. Academic dishonesty, including any form of cheating will not be tolerated and may result in failure of the course and/or formal disciplinary proceedings that may lead to suspension or dismissal. Cheating includes but is not limited to such acts as offering or receiving unpermitted assistance in the exams, using any type of unauthorized written material during the exams, handing in any part or all of someone else's work as your own, copying from an internet source. Plagiarism is a specific form of cheating. It means using someone else's work without giving credit and it is a form of literary theft.