

İZMİR INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
ME332 THEORY OF MACHINES II
SPRING 2023-2024

COURSE INSTRUCTOR

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

COURSE ASSISTANTS

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

Ms. Merve Özkahya (Room: Z31 – Mechatronics Laboratory, merveozkahya@iyte.edu.tr, 750 6752)

Mr. Tuğrul Yılmaz (Room: Z56 – Human-Robot Interaction Laboratory, tugrulyilmaz@iyte.edu.tr, 750 6795)

COURSE SCHEDULE

Lecture hours: Wednesday 13:30-15:15 / Friday 11:45-12:30 @D14

ONLINE COURSE PLATFORMS

Cloud-LMS: <https://cloud-lms.iyte.edu.tr> ⇒ ME332

STRONGLY RECOMMENDED PREREQUISITES

ME222 Dynamics, ME242 Applied Mathematics for Engineers, ME331 Theory of Machines I

COURSE CONTENT (Detailed content is presented in the 2nd page)

Dynamic force and motion analysis of planar mechanisms, introduction to vibratory systems, kinematic synthesis of planar linkages, design of cam mechanisms.

REFERENCES

E. Söylemez, Mechanisms, METU Press, 5th Edition, 2018.

Online version: <https://blog.metu.edu.tr/eresmech/mechanisms/>

E. Söylemez, Makina Teorisi 2: Makina Dinamiği, Birsen Yayınevi, 3rd Edition, 2017.

J. J. Uicker, G. R. Pennock, J. E. Shigley, Theory of Machines and Mechanisms, Oxford University Press, 4th Edition, 2010.

A. G. Erdman, G. N. Sandor, Mechanism Design: Analysis and Synthesis Volume I, Prentice-Hall, 4th Edition, 2001.

R. L. Norton, Design of Machinery: An Introduction to the Synthesis and Analysis of Mechanisms and Machines, McGraw-Hill, 5th Edition, 2011.

S. G. Kelly, Fundamentals of Mechanical Vibrations, McGraw-Hill, 2nd Ed., 2000.

Many other machine theory books are available with call numbers starting TJ175 in the library.

COMPUTER SESSIONS, QUIZZES and FINAL EXAMINATION

3 quizzes will be applied throughout the semester. Computer sessions will be conducted as demonstration by the instructor. There will be a Midterm and a Final Examination. Make-up quizzes/examination are offered for the students who have a valid excuse approved by the department.

TENTATIVE GRADING

Attendance (%5) + Quizzes (%15) + Midterm Examination (%35) + Final Exam (%45)

ACADEMIC ETHICS

According to Personal Data Protection Law, sharing any kinds of lecture materials (handouts, homework/quiz/exam questions, etc.) with third parties, use them on the web, or publish them through any social network without written approval of our institution is strictly forbidden even after your graduation. 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. 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.

ME332 THEORY OF MACHINES II - TENTATIVE COURSE CONTENT

Color code	Theoretical lectures (29 hrs)	Computer Sessions (6 hrs)	Quizzes + Midterm Examination (5 hrs)
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Date	Topic	Main Reference (Book or notes)	Supplementary material
Feb 21	Introduction; Review of dynamic force analysis of mechanisms	Söylemez, Makina Dinamiği or Norton, Design of Machinery	
Feb 23	Virtual work method		Exercise pdf
Feb 28	Static and dynamic force analysis with virtual work method		Exercise pdf
Mar 1	Quiz 1		
Mar 6	Dynamic motion analysis; Influence coefficients; Generalized torque	Söylemez, Makina Dinamiği or Norton, Design of Machinery	
Mar 8	Equation of motion		Exercise pdf
Mar 13	Flywheel design		Exercise pdf
Mar 15	Motors		Motor Catalog
Mar 20	Dynamic motion analysis with Matlab Simulink		Matlab files
Mar 22	Quiz 2		
Mar 27	Introduction to mechanical vibrations	Kelly, Fundamentals of Mechanical Vibrations	
Mar 29	Free vibrations of single DoF systems		
Apr 3			
Apr 5	Harmonic excitation of single DoF systems		
Apr 17			Exercise pdf
Apr 19			
Apr 24	Midterm Examination		
Apr 26	Introduction to kinematic synthesis of mechanisms	Erdman & Sandor, Mechanism Design	
May 3	Graphical methods for kinematic synthesis		Solidworks & Geogebra files
May 8	Analytical function generation synthesis		Exercise pdf
May 10	Dead-center design		Exercise pdf
May 15			
May 17	Quiz 3		
May 22	Introduction to cam mechanisms; Cam motion profiles	Söylemez, Mechanisms	Excel Files
May 24	Cam size determination		Exercise pdf
May 29	Determination of the cam profile		Excel Files
May 31	Course overview		