

ME 405 - Mechanical Vibrations
Fall 2022-2023
Syllabus

COURSE	Bekir Bediz		
INSTRUCTOR	Mechatronics Engineering	E-mail:	bbediz@sabanciuniv.edu
	Office: FENS 2080	Office Hour:	Monday 15:00-16:00
COURSE ASSISTANT	Peiman Khandar Shahabad	E-mail:	peiman@sabanciuniv.edu
	Mechatronics Engineering	Office Hour:	TBA
COURSE SCHEDULE	<u>Lecture:</u>		
	Monday : 12:40 - 14:30 @ FENS L056 Tuesday : 16:40 - 17:30 @ FENS G015		
REFERENCES	There is no specific textbook for the material presented in this course. Students are recommended to follow the references occasionally:		
	<ul style="list-style-type: none">• L. Meirowitch, <i>Fundamentals of Vibrations</i>, McGraw Hill, 2001.• S. S. Rao, <i>Mechanical Vibrations</i>, Pearson, 2010.• D. J. Inman, <i>Engineering Vibration, 4th Edition</i>, Pearson, 2014.• S. G. Kelly, <i>Fundamentals of Mechanical Vibrations</i>, McGraw Hill, 1993.		
PURPOSE OF THE COURSE:	This course is designed both for undergraduate and graduate students. It is aimed to teach the fundamental concepts how systems vibrate. Fundamental aspects of vibrations for mathematical modeling, derivation/solution of equations of motion, and subsequent system analysis will be covered for discrete systems.		
OBJECTIVES:	After the course, the students should be able to		
	<ul style="list-style-type: none">• have a basic understanding of the fundamental approaches to mathematical modeling and derivation of equations of motions for modeling vibration behavior of mechanical systems.• have a basic understanding of the characteristics of vibratory systems.• model discrete systems including single- and multi-degree of freedom systems.• outline the properties of natural frequencies and mode shapes, and perform modeling through modal analysis.		
COURSE CONTENT	<ul style="list-style-type: none">• Basic concepts of vibrations• Analysis of single degree of freedom (SDOF) systems by using complex vector representation• Vibration measurement, vibration measuring devices and vibration criteria• Frequency Response Functions (FRF) and system identification• Response of SDOF to periodic excitation• Response of SDOF to non-periodic excitation• Free vibration of multi degree of freedom (MDOF) systems• Harmonic response of multi degree of freedom (MDOF) systems		

GRADING POLICY

For undergraduate students:

Homework (30%), Midterm (30%), Final Exam (40%)

For graduate students:

Homework (15%), Midterm (25%), Project (30%), Final Exam (30%)

- Zero credit for late homework unless arrangements are made in advance. You can discuss the problems with your classmates but copying work is against University regulations.
- One make-up examination, covering the whole course material, will be given after the final/oral exam date for the students who missed the midterm and/or final examination due to a valid excuse approved by the faculty/medical center. All examinations will be closed book and notes. The necessary formula will be provided to the students.
- All solutions (homework, exam) must be written in a professional manner. You may lose points for poorly written answers.
- No extra homework/exam/project/etc. will be given to increase your grade at the end of the semester.
- Students who miss any of the exams will get N/A from the course.

DISCLAIMER

Time conflict requests can be accepted for one hour only (both for lectures and recitations). Students who are registered to the course with time-conflict override accept the responsibility of any inconvenience that might occur due to missed content and/or quizzes. No make-up will be available for missed quizzes/content. To get approval for time conflict, you need to send an e-mail stating you are aware of these facts and you accept the responsibility.

ACADEMIC INTEGRITY

Students are expected to be familiar with and comply with Sabanci University Academic Integrity Statement. Any form of academic dishonesty (plagiarism, copying/using other people's work, attending classes/exams on behalf of other people, *etc.*) will be penalized with a failing grade for the related assignment, quiz, or exam and disciplinary actions will be taken.