

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department
 2021-2022 Spring Semester

Syllabus

Code/Name	SEC 402.4 / Mechanical Vibrations
Type	Elective
Credit/ECTS	6/6
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/4
Semester	Spring
Classroom	Th Th F D109 D109 D109
Content	This is an introductory course in the basic theory and applications of vibration engineering. Free and forced vibration of single degree of freedom and multi degrees of freedom systems. Response to harmonic excitations. Vibration under general forcing. Vibration of continuous systems. Vibration measurement and passive vibration control. Analytical and experimental modal analysis.
Prerequisites	MEC 203 Dynamics
Textbooks	<p>Primary SS Rao, Mechanical Vibrations, Pearson, 8th Ed., 2018.</p> <p>Supplementary DJ Inman, Engineering Vibration, Pearson, 4th Ed., 2014. MP Norton and DG Karczub, Fundamentals of Noise and Vibration Analysis for Engineers, Cambridge University Press, 2003.</p>
Objectives	<ul style="list-style-type: none"> • To formulate the equations of motion of vibrating systems • To analyze free and forced vibrations of SDOF and MDOF linear systems • To compute dynamic properties of mechanical systems
Course Outcomes	In this course you will be able to: C01 Categorize vibration analysis procedures C02 Predict the behavior of vibrating systems C03 Calculate the response of systems to different excitation functions C04 Compute natural frequencies and mode shapes C05 Perform modal analysis C06 Evaluate passive vibration isolation methods

Weekly Schedule of Topics

W	Topic
1	Basic concepts of vibration
2	Vibration analysis procedure
3	Free vibration of SDOF systems
4	Free vibration of SDOF systems
5	Forced vibration of SDOF systems
6	Two degrees of freedom systems
7	MDOF systems
8	MDOF systems
9	Eigenvalue problem
10	Modal analysis

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11	Modal analysis
12	Vibration suppression
13	Continuous systems
14	Continuous systems

Professional Contribution Ability to identify various types of practical vibration problems and develop mathematical models to find the response, and interpret the results

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
C01	5	4	0	3	0	4	2	3	3	3	1
C02	5	4	0	3	0	4	2	3	3	3	1
C03	5	5	0	3	0	4	5	3	3	3	3
C04	5	5	3	3	4	4	5	3	3	4	3
C05	5	5	3	3	0	4	5	3	3	4	3
C06	5	5	3	3	4	4	5	3	3	4	3

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions

- Students work in groups for the presentations.
- The consequence of violation of the attendance rule is to receive a grade of **DZ**.

Requirements Basic knowledge of a dynamic analysis software and Matlab

Course Policy

1. You must attend at least 70% of the sessions including add-drop period.
2. Be in the class on time.
3. English should always be used to communicate with one another.
4. Mobile phone should be switched off and put away during the class.
5. You cannot talk to your friends during class no matter what the subject is.

Cheating & Plagiarism

- Copying or letting someone to copy your work on exams, assignments, or reports is cheating.
- Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism.
- The consequence of academic dishonesty is to receive a grade of **FF** for the course.

Evaluation

Assignments (4×5 pts.)	20%
Presentations (3×10 pts.)	30%
Term Project (1×20 pts.)	20%
<u>Final Exam</u>	<u>30%</u>
Total	100%

Rubric A rubric will be announced prior to presentation sessions. The rubric has 2 main parts for the grading: technical assessment (50%) and writing or presentation performance (50%)

Instructor

Name/Surname	Akin Oktav	Email	akin.oktav@alanya.edu.tr
Room	209	Office Hours	M 14.30-15.30 Th 16.00-17.00

Prepared by Akin Oktav on January 15th, 2022