Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department

SYLLABUS

Code/Name	MCE 406.4 / Mechanical Vibrations
Type	Technical Elective
Credit/ECTS	3/6
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/4
Semester	Spring
Classroom	D204
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	***Primary*** SS Rao, Mechanical Vibrations, Pearson, 8th Ed., 2018. ***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.
Objectives	• 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: CO1 Categorize vibration analysis procedures CO2 Predict the behavior of vibrating systems CO3 Calculate the response of systems to different excitation functions CO4 Compute natural frequencies and mode shapes CO5 Perform modal analysis CO6 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

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
CO1	5	4	0	3	0	4	2	3	3	3	1
CO2	5	4	0	3	0	4	2	3	3	3	1
CO3	5	5	0	3	0	4	5	3	3	3	3
CO4	5	5	3	3	4	4	5	3	3	4	3
CO5	5	5	3	3	0	4	5	3	3	4	3
CO6	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 not participating in the presentation is an FF grade.**
Requirements	Basic knowledge of dynamic analysis software and Matlab
Course Policy	• Be in the class on time. • English should always be used to communicate with one another. • At least 70% attendance is required, otherwise a grade of **DZ** will be assigned. • You must be present in class for the presentations, otherwise you will not be graded for the presentation.
Cheating & Plagiarism	• Copying or letting someone copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from 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	Midterm Exam 30% Presentation 10% Final Exam 60% Total 100%
Rubric	Rubric will be announced prior to presentation sessions. The rubric has 2 main parts for the grading: technical assessment and writing or presentation performance.

Instructor

Name/Surname	Akın Oktav	Email	akin.oktav@alanya.edu.tr
Room	218	Office Hours	

Updated by Akın Oktav