



Department	Course Name	Course Number	Semester
Mechanical Engineering	Non-Linear Vibrations	0904919	

2025 Course Catalog Description

Vibrations of non-linear single-degree-of-freedom systems; Singular points; Liapunoff function; Approximation techniques used in nonlinear vibration; Perturbation theory for the eigenvalue problem; Stability; Self-excited vibrations; Vibrations of non-linear multi-degree-of-freedom systems; bifurcations and chaos in dynamical systems. For simulation and analysis, this course will use computer programming such as MAPLE and MATLAB.

Instructors

Name	E-mail	Section	Office Hours	Lecture Time

Prerequisites

Prerequisites by topic	
Prerequisites by course	
Co-requisites by course	
Prerequisite for	

Topics Covered

Week	Topics
1	
2	
3	
4	
5	
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11	
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13	
14	
15	

Evaluation

Assessment Tools	Expected Due Date	Weight



Contribution of Course to Meet the Professional Components									
Relationship to Student Outcomes									
SOs	1	2	3	4	5	6	7		
Availability									
Relationship to Aeronautical Engineering Program Objectives (AEPOs)									
AEPO1	AEPO2	AEPO3	AEPO4	AEPO5					
ABET Student Outcomes (SOs)									
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics								
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors								
3	An ability to communicate effectively with a range of audiences								
4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts								
5	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives								
6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions								
7	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies								
Updated by ABET Committee, 2025									