

Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Dynamics of Mechanical Systems
Code der Lehrveranstaltung	47561
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	IIND-02/A
Sprache	Englisch
Studiengang	Master in Industrie- und Maschineningenieurwesen
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	dr. Veit Gufler, Veit.Gufler@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/38756
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	1
KP	5
Vorlesungsstunden	28
Laboratoriumsstunden	18
Stunden für individuelles Studium	79
Vorgesehene Sprechzeiten	
Inhaltsangabe	Understanding and knowledge of the fundamentals for both the theoretical as well as the experimental sides of mechanical vibrations. This includes the mathematical modeling of dynamical problems, the solving of these derived mathematical models and understanding of the results. Furthers, the students will gain practical experience of mechanical vibrations in a laboratory environment.

Themen der Lehrveranstaltung	1) Dynamics of vibrating systems with one degree of freedom: • Modeling • Free response • Harmonic excitation and frequency response • Forced response to impulse, step forces • Response to base excitation and isolation 2) Dynamics of vibrating systems with more degrees of freedom • Modeling • Modal analysis • Forced response 3) Continuous systems • Basic models and relations 4) Laboratory experiences • Introduction to data acquisition and sensors for dynamic measurements • Numerical and experimental applications.
Stichwörter	dynamic systems, mechanical vibrations, modal analysis, resonance, frequency response
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	Fundamentals of mechanics and mathematics learned in bachelor's degree studies of mechanical engineering.
Unterrichtsform	Frontal lectures, hand calculation exercises, computer exercises, laboratory exercises.
Anwesenheitspflicht	Not mandatory but strongly recommended.
Spezifische Bildungsziele und erwartete Lernergebnisse	The learning outcomes need to refer to the Dublin Descriptors: 1. Knowledge and understanding: Knowledge and understanding of the fundamentals of vibration mechanics. 2. Applying Knowledge and understanding: Applying knowledge and understanding to analyze dynamical components, structures, and systems. 3. Making judgments: The structural mechanical design under consideration of dynamical considerations including vibrations requires understanding and

	ability to make judgments based on theory and experiments. 4. Communication skills: Communication skills to convey and transfer understanding of mechanical vibrations. Communication skills to explain results of dynamical analysis and their consequences to structural mechanical design. 5. Learning skills Learning skills to independently study the specific fields of mechanical vibrations for applications beyond this lecture.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	- Formative assessment: In class exercises: during the course; ILOs assessed: 1, 2, 3, 4; - Summative assessment: 100% written exam: 2 hours; ILOs assessed: 1, 2, 3, 4.
Bewertungskriterien	The written exam includes numerical exercises, theoretical questions and questions related to the laboratory activities (no books or own notes are allowed during the exams). Exercises and questions will show ability to solve problems of mechanical vibrations as well as knowledge-based questions to show understanding of the material.
Pfichtliteratur	• Lecture slides • Notes taken during lecture
Weiterführende Literatur	• S. G. Kelly. Mechanical vibrations: Theory and applications. Stamford: Cengage, 2012 • T. L. Schmitz and K. S. Smith. Mechanical vibrations: Modeling and measurement. Cham: Springer, 2021. https://doi.org/10.1007/978-3-030-52344-2
Weitere Informationen	
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung, Industrie, Innovation und Infrastruktur, Bezahlbare und saubere Energie