

Studiengang: Bachelor of Science Maschinenbau

Program: Bachelor of Science in Mechanical Engineering



1	Module: Mechanical Vibrations				English
	<i>Modul: Maschinendynamik</i>				<i>English</i>
		Semester <i>Semester</i> 6. semester	Dauer <i>Duration</i> 1 semester	Status <i>Status</i> compulsory	Turnus <i>Regular cycle</i> annually
	Kreditpunkte <i>Credits</i> 5 ECTS	Aufwand <i>Workload</i> 150h	Kontaktzeit <i>Contact-hours</i> 4SWS = 60h lectures	Selbststudium <i>Student's efforts</i> 30h pre-/post-preparation 60h exercises	Gruppengröße <i>Team size</i> < 25 (lecture)
2	Beschreibung <i>Description</i> This course gives an introduction to mechanical vibrations, to free and forced vibrations of different mechanical systems. Various types of forcing functions are considered/investigated for both damped and undamped systems. Aspects of measuring and controlling vibrations are also considered.				
3	Lernziele <i>Learning Outcomes</i> <ul style="list-style-type: none"> • model simple vibratory systems. • determine equations of motion for idealized systems. • solve equations of motion for single degree of freedom systems subject to harmonic, general periodic and arbitrary forcing functions. • write equations of motion for idealized multi-degree of freedom systems. • determine natural frequencies and mode shapes for systems with two and three degrees of freedom. • establish technical measures to handle vibrations in mechanical systems as desired. • be able to identify and estimate system parameters for lumped parameter systems 				
4	Schlüsselqualifikationen				
	<i>Key qualifications</i>				
	Sozialkompetenz	Methodenkompetenz	Selbstkompetenz / Personenkompetenz	Interkulturelle Kompetenz	Medienkompetenz
	X	X	X		
5	Lehrveranstaltung/ -methoden <i>Course type and methods</i> Vorlesung / Lectures <ul style="list-style-type: none"> • Lectures, that will take form of seminars • Drill and practice • Demonstration of various kinds of vibration measurements within lab Praktikum/Projekt / Lab <ul style="list-style-type: none"> • Lecturing will be accompanied by introducing students to using a Multi-Body-Simulation-Software and solving various tasks of different skill-levels 				
6	Vorbedingungen / Vorkenntnisse <i>Prerequisites</i> Strongly recommended <ul style="list-style-type: none"> • Basics of dynamics • Integral and differential calculus, including differential equations as well as systems of differential equations 				
7	Arbeitsmittel / Literatur <i>Required material / Literature</i> <ul style="list-style-type: none"> • Handouts to lecture and to exercises • Schaum's series: Mechanical Vibrations S.G. Kelly, McGraw Hill, • Fundamentals of Mechanical Vibrations S.G. Kelly, McGraw Hill Higher Education • Recommended supplementary literature according to handout to lecture 				

Detailinformationen

8	<p>Inhalte <i>Course topics</i></p> <p>Vorlesung / Lecture Review: Modeling mechanical systems Review: Solving differential equations - analytical, numerical methods Systems with one degree of freedom Free vibration. Harmonic excited vibrations Fourier series, periodic functions Transient vibrations Systems with two or more degrees of freedom Derivation of governing equations Free vibrations Forced vibrations Vibration Measurement and Analysis Vibration Control Introduction to Vibrations of continuous systems</p>														
9	<p>Prüfungsform <i>Assessment</i></p> <p>Prüfungsvorleistung / Prerequisite: none Fachprüfung / Examination: written test</p>														
10	<p>Voraussetzung für die Vergabe von Kreditpunkten <i>Requirements for granting of credits</i></p> <p>Successfully passing all individual parts of the examination according to row 9 „Assessment“</p>														
11	<p>Weiterführende Veranstaltungen <i>Related courses</i></p> <p>none</p>														
12	<p>Zuordnung <i>Classification</i></p> <table border="1" data-bbox="209 1003 1514 1084"> <thead> <tr> <th>Mathematik & Naturwissenschaft</th> <th>Ingenieurwissenschaften</th> <th>Ingenieur-anwendungen</th> <th>Entwicklung & Konstruktion</th> <th>Werkstoffe</th> <th>Wirtschaft, Management, Sprachen</th> <th>Anderes</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Mathematik & Naturwissenschaft	Ingenieurwissenschaften	Ingenieur-anwendungen	Entwicklung & Konstruktion	Werkstoffe	Wirtschaft, Management, Sprachen	Anderes	X	X	X	X			
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13	<p>Modulbeauftragter / Lehrpersonen <i>Responsible person / Lecturers</i></p> <p>Prof. Dr.-Ing. Hans Reddemann / Prof. Dr.-Ing. Hans Reddemann</p>														