Valid from 2024.HS

Module description: Mechanical Vibrations

Module Code	t.BA.MT.MDYN.19HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IMES
Module Coordinator	Robert Eberlein
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3b 2 lecture lessons per semester week and class+ 4 lab bi-weekly lessons per semester and half-class
Module Description	Mechanical vibrations
Module Content	**Fundamentals: Definition of vibrations and system** **Fundamentals: Classifications of vibrations** • Classification by amplitude • Classification by shape of motion • Classification by degree of freedom (DOF) • Classification by linearity • Classification by time dependency **Linear single degree of freedom (SDF) systems: Free Vibrations** • Undamped free vibrations • Spring constants of elastic systems • Damped free vibrations **Linear single degree of freedom (SDF) systems: Forced Vibrations** • Undamped forced vibrations • Jeffcott single mass rotor (Laval shaft) • Damped forced vibrations **Free vibrations of 2-dof systems** **Free vibrations of MDF systems** **Free torsional vibrations of 3-dof systems** **Periodic excitation of 2-dof systems** • Periodic excitation – Fourier series • Periodic excitation of torsional shafts
Prerequisite Knowledge	Mandatory module in MT curriculum

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Learning Objectives (Competences)

Students...	Competencies	Taxonomies
Derivation of discrete linear equations of motion for oscillating systems	M, F	K3
Analytical and numerical solving of SDF mass spring damper systems	F, M	K4
Analytical and numerical solving of MDF systems	M, F	K3
Knowing and applying experimental methods for parameter determination of oscillating systems	F, M	K2

Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	90	80	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
written exam	Grade	30	20	acc. to module agreement

Classroom Attendance Requirement

None

Learning material

- Schmitz, T. & Smith, K. (2014). 1 Edition. New York: Springer NY. ISBN 978-1-4939-0152-4.
- Gross, D. & Hauger, W. & Schröder, J. & Wall, W. (2019). 14 Edition. Heidelberg: Springer Vieweg Bermin. ISBN 978-3-662-59551-0.

Comments