

Continuum Mechanics					
Module-No./Abbreviation	Credits	Workload	Term	Frequency	Duration
CE-P07/CM	6 CP	180 h	2 nd Sem.	Summer term	1 Semester
Courses Continuum Mechanics			Contact hours 4 SWS (60 h)	Self-Study 120 h	Group Size: No Restrictions
Prerequisites Mathematical Aspects of Differential Equations and Numerical Methods (CE-P01), Mechanical Modeling of Materials (CE-P02)					
Learning goals / Competences Extended knowledge in continuum-mechanical modeling and solution techniques as a prerequisite for computer-oriented structural analysis. After successfully completing the module, the students <ul style="list-style-type: none"> • will possess extended knowledge of continuum mechanics • will be able to formulate problems of structural and material mechanics within the framework of continuum mechanics • will have mastered solution techniques for mechanical problems as a prerequisite for computer-oriented analysis • will be able to create mathematical models for engineering systems and processes • will be able to interpret modeling results and revise models accordingly 					
Content The course starts with an introduction to the advanced analytical techniques of linear elasticity theory, then moves on to the continuum-mechanical concepts of nonlinear elasticity and ends with the discussion of material instabilities and microstructures. Numerous examples and applications will be given: <ul style="list-style-type: none"> • Advanced Linear Elasticity • Beltrami equation • Navier equation • Stress-functions • Scalar- and vector potentials • Galerkin-vector • Love-function • Solution of Papkovitch - Neuber • Nonlinear Deformation • Strain tensor • Polar decomposition • Stress-tensors • Equilibrium • Strain-rates • Nonlinear Elastic Materials • Covariance and isotropy • Hyperelastic materials • Constrained materials • Hypoelastic materials 					

<ul style="list-style-type: none">• Objective rates• Material stability• Microstructures
Teaching methods / Language Lecture (2h / week), Exercises (2h / week) / English
Mode of assessment Written examination (120 min, 100%)
Requirement for the award of credit points Passed final module examination
Module applicability MSc. Computational Engineering
Weight of the mark for the final score 4 %
Module coordinator and lecturer(s) Prof. Dr. rer. nat. K. Hackl, Assistants
Further information