

Nonlinear Finite Element Methods for Structures					
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Module number BI-WP05/CE-WP04/SE-CO-23	Credits 6 CP	Workload 180 h	Semester[s] 2. Sem.	Duration 1 Semester[s]	Group size no limitation
Courses a) Nonlinear Finite Element Methods for Structures			Contact hours a) 4 WLH (60 h)	Self-study a) 120 h	Frequency a) each summer
Module coordinator and lecturer(s) Prof. Dr. Roger A. Sauer a) Assistants, Prof. Dr. Roger A. Sauer					
Admission requirements Recommended previous knowledge: Finite Element Methods in Linear Structural Mechanics (CE-P05/SE-C-2/FEM-I), Basic knowledge in Structural Mechanics					
Learning outcome, core skills After successfully completing the module, the students <ul style="list-style-type: none"> • understand the origins and implications of nonlinearities in structural mechanics • are able to formulate and solve nonlinear engineering problems with the finite element method accounting for geometrical and material nonlinearities • can perform structural analyses, where the linear (1st order) theory is not valid (e.g. cables, membrane structures, load bearing and stability analyses beyond limit loads), and they can assess the results. 					
Contents a) The main topics of the course are: <ul style="list-style-type: none"> • formulation and finite element discretization of the basic equations for nonlinear materials and geometrically nonlinear analysis in structural mechanics • development of algorithms for the solution of the underlying nonlinear material and structural equations • application to analyze the structural behavior considering material nonlinearity and large deformations • nonlinear stability analysis of structures 					
Educational form / Language a) Tutorial (2 WLH) / Lecture (2 WLH) / English					
Examination methods • Written exam 'Nonlinear Finite Element Methods for Structures' (120 min., Part of modul grade 100 %)					
Requirements for the award of credit points <ul style="list-style-type: none"> • Passed final module examination 					
Module applicability <ul style="list-style-type: none"> • M.Sc. Civil Engineering 					

- M.Sc. Computational Engineering
- M.Sc. Subsurface Engineering

Weight of the mark for the final score

Percentage of total grade [%] = $6 * 100 * \text{FAK} / \text{DIV}$

FAK: The weighting factors can be taken from the table of contents.

DIV: The values can be taken from the table of contents.

Further Information