

Nonlinear Finite Element Methods for Structures					
Module-No./Abbreviation CE-WP04/FEM-II	Credits 6 CP	Workload 180 h	Term 2 nd Sem.	Frequency Summer term	Duration 1 Semester
Courses Advanced Finite Element Methods			Contact hours 4 SWS (60 h)	Self-Study 120 h	Group Size: No Restrictions
Prerequisites Finite Element Methods in Linear Structural Mechanics (CE-P05), Basic knowledge in Structural Mechanics					
Learning goals / Competences After successfully completing the module, the students understand the origins and implications of nonlinearities in structural mechanics <ul style="list-style-type: none"> • 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. 					
Content 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 					
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, MSc. Bauingenieurwesen					
Weight of the mark for the final score 6 %					
Module coordinator and lecturer(s) Prof. Dr. Roger A. Sauer, Assistants					
Further information					