

<b>Finite Element Method for Nonlinear Analyses of Materials and Structures</b>					
<b>Module-No./Abbreviation</b>	<b>Credits</b>	<b>Workload</b>	<b>Term</b>	<b>Frequency</b>	<b>Duration</b>
CE-WP06/FEM-III	3 CP	90 h	2 <sup>nd</sup> Sem.	Summer term	1 Semester
<b>Courses</b> Finite Element Method for Nonlinear Analyses of Inelastic Materials and Structures			<b>Contact hours</b> 2 SWS (30 h)	<b>Self-Study</b> 60 h	<b>Group Size:</b> No Restrictions
<b>Prerequisites</b> Basic knowledge of tensor analysis, continuum mechanics and linear Finite Element Methods is required; participation in the lecture „Advanced Finite Element Methods” (CE-WP04) is strongly recommended.					
<b>Learning goals / Competences</b> After successfully completing the module, the students <ul style="list-style-type: none"> <li>• know methods for the modeling of elastoplastic materials,</li> <li>• have skills to select appropriate numerical methods and material models for practical problems and they can assess the limitations of the selected approaches.</li> </ul>					
<b>Content</b> The course is concerned with inelastic material models including their algorithmic formulation and implementation in the framework of nonlinear finite element analyses. Special attention will be paid to efficient algorithms for physically nonlinear structural analyses considering elastoplastic models for metals, soils and concrete as well as damaged based models for brittle materials. As a final assignment, the formulation and implementation of inelastic material models into an existing finite element program and its application to nonlinear structural analyses will be performed in autonomous teamwork by the participants.					
<b>Teaching methods / Language</b> Lecture including Exercises (2h / week) / English					
<b>Mode of assessment</b> Project work (implementation of nonlinear material models) and final student presentation within the scope of a seminar (100%)					
<b>Requirement for the award of credit points</b> Passed project work and final student presentation					
<b>Module applicability</b> MSc. Computational Engineering					
<b>Weight of the mark for the final score</b> 3 %					
<b>Module coordinator and lecturer(s)</b> Prof. Dr. techn. G. Meschke, Dr.-Ing. A. Alsahly, Assistants					
<b>Further information</b>					