

Object-oriented Modeling and Implementation of Structural Analysis Software					
Module-No./Abbreviation	Credits	Workload	Term	Frequency	Duration
CE-WP10/OOFEM	3 CP	90 h	2 nd Sem.	Summer term	1 Semester
Courses Object-oriented Modeling and Implementation of Structural Analysis Software			Contact hours 2 SWS (30 h)	Self-Study 60 h	Group Size: No Restrictions
Prerequisites Finite Element Methods in Linear Structural Mechanics (CE-P05) and Modern Programming Concepts in Engineering (CE-P04)					
Learning goals / Competences The seminar connects the theory of finite element methods (FEM) and object-oriented programming. After successfully completing the module, the students <ul style="list-style-type: none"> • can implement the theories and methods of the course 'Finite Element Methods in Linear Structural Mechanics' in an object-oriented finite element program and apply this program for the analysis of engineering structures, • have developed a program for the computation of spatial truss structures, • can verify the program using benchmark examples, • gained deep insight into the most relevant aspects for the implementation within the FEM and possibilities of using object-oriented programming for numerical approaches. 					
Content The main topics of the course are: <ul style="list-style-type: none"> • short summary of the basics of FEM and project-oriented programming • preparing a project with two parts <ul style="list-style-type: none"> - Part 1: students individually develop and verify an object-oriented finite element program for the linear analysis of spatial truss structures - Part 2: students can choose between different options, either, the application developed in the Part 1 is extended to more challenging problems (nonlinear analysis, other element types, etc.) or students switch to an existing object-oriented finite element package (e.g. Kratos) and develop an extension of that software (e.g. material models, element formulations) 					
Teaching methods Block seminar / equiv. to 2h lecture					
Mode of assessment Project work and final student presentation (100 %)					
Requirement for the award of credit points Passed project work and final student presentation					
Module applicability MSc. Computational Engineering, MSc. Bauingenieurwesen					
Weight of the mark for the final score 3 %					
Module coordinator and lecturer(s) Prof. Dr. techn. G. Meschke, Prof. Dr.-Ing. M. Baitsch, Assistants					
Further information					