Applied Computational Simulations of Structures

Module-No./Abbreviation
CE-WP11/ACSoS

<table>
<thead>
<tr>
<th>Credits</th>
<th>Workload</th>
<th>Term</th>
<th>Frequency</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 CP</td>
<td>180 h</td>
<td>2nd Sem.</td>
<td>Summer term</td>
<td>1 Semester</td>
</tr>
</tbody>
</table>

Courses

a) Applied Finite Element Methods
b) Finite Element Methods in Linear Computational Dynamics

<table>
<thead>
<tr>
<th>Contact hours</th>
<th>Self-Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2 SWS (30 h)</td>
<td>a) 60 h</td>
</tr>
<tr>
<td>b) 2 SWS (30 h)</td>
<td>b) 60 h</td>
</tr>
</tbody>
</table>

Prerequisites

Finite Element Methods in Linear Structural Mechanics (CE-P05), Recommended: Adaptronics (CE-WP03)

Learning goals / Competences

After successfully completing the module, the students
- have the ability to model structures using commercial finite element software and to verify and assess the simulation results,
- can generate simulation models for structures with static and dynamic loading and write reports,
- can handle digital interfaces between BIM and structural analysis software to convert CAD models into structural simulation models,
- can perform transient and dynamic analyses of materials and structures.

Content

a) Applied Finite Element Methods
The course deals with the application of finite element simulations in structural engineering.

This includes:
- handling of commercial finite element software
- modeling methods and sources of modeling errors
- pre- and post-processing
- BIM-FE interfaces

b) Finite Element Methods in Linear Computational Dynamics
The following topics are part of the lectures and exercises:
- Basics of linear Elastodynamics and Finite Element Methods in Structural Dynamics
- Explicit and implicit integration methods with emphasis on generalized Newmark-methods
- Computer lab: Implementation of algorithms into Finite Element programs

Teaching methods / Language

a) Seminar (2 SWS) / English  b) Exercises (1 SWS), Lectures (1 SWS) / English

Mode of assessment

Homework: Applied computational simulations of structures with static and dynamic loadings (60 hours, 100%), homework partially with presentations (60 hours, deadlines will be announced at the beginning of the semester)

Requirement for the award of credit points

Passed homework

Module applicability

MSc. Computational Engineering, MSc. Bauingenieurwesen

Weight of the mark for the final score

6 %
<table>
<thead>
<tr>
<th>Module coordinator and lecturer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Dr. techn. G. Meschke, Assistants</td>
</tr>
</tbody>
</table>

**Further information**