

## Module Description Finite Element Analysis (FEA)

Name of module:	Finite Element Analysis (FEA)
Keywords:	Finite Element Method, ANSYS
Module number:	Not compulsory
Target groups:	3- 7 semester exchange students
ECTS Credits:	4
Language of instructions:	English
Module owner:	Prof. Dr.-Ing. Carsten Block
Last update	June 21st 2021

### Extent of work (hours)

Workload	Contact hours	Self-Study	Exam Preparation
80	40	20	20

Prerequisites:	Basic courses in engineering mechanics and mathematics
Total target:	<ul style="list-style-type: none"> <li>Formulate, analyse, and verify mechanical system analysis problems using an industry standard finite element analysis (FEA) software</li> <li>Understand the structure and operation of a commercial FEA program (ANSYS)</li> <li>Analyse deformations, forces, strains and stresses under a variety of loading conditions, including static and dynamic load cases</li> </ul>
Module contents:	<ul style="list-style-type: none"> <li>Introduction to finite element analysis and ANSYS</li> <li>Data transfer from CAD to FEA</li> <li>Modelling, meshing, applying loads and boundary conditions</li> <li>Determination of displacements and stresses in beams, trusses and three-dimensional bodies</li> <li>Validation and Verification in FEA</li> </ul> <p>Laboratory Work</p> <ul style="list-style-type: none"> <li>Introduction to ANSYS Workbench</li> <li>Application to example problems (beams, trusses, three-dimensional bodies)</li> </ul> <p>Group Project</p> <ul style="list-style-type: none"> <li>Use of FEA to solve an engineering problem</li> <li>Documentation in a professional engineering report</li> </ul>
Reference material:	Lecture notes
Offered:	Winter semester
Relevance for other study programmes:	Mechatronics

### Submodules and assessments

Type of instruction/ form of learning:	Lectures, practices and project work
Duration:	October - December
Hours per week:	4
Aims, learning outcomes:	See above
Estimated student workload:	40
Type of Assessment:	in-class exercises; project work
Number of participants:	Due to the limited number of participants, please register in advance by email to: <a href="mailto:kremena.daneva@hs-esslingen.de">kremena.daneva@hs-esslingen.de</a>