Department	SciTec
Degree programme	SI
Module name	**FEM and Simulation**
Module number	**SciTec.2.250**
Study and Examination Regulations	ER-version 41 (of 16.07.2021)
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Frank Dienerowitz
Module content	FEM-analysis for the following structural mechanics problems: ▪ buckling (linear and non-linear) ▪ contact mechanics ▪ modal analysis ▪ harmonic analysis introduction to optimisation: ▪ parameterisation of problems ▪ sensitivity analysis (design of experiments, evaluation of results, deriving meta model) ▪ optimisation (design space, objective function, optimisation methods, robust optimisation)
Learning objectives	The students: ▪ are able to categorise problems of "buckling", "contact mechanics", "modal analysis" and "harmonic analysis" ▪ to implement and analyse them using computer-based tools ▪ are able to cross check results of simple problems by means hand calculation ▪ are knowledgeable about key limitations and challenges for these problems ▪ are able to implement and conclude optimisation problems (mathematical model is given, up to around 10 parameters) using computer-based tool, performing sensitivity analysis and optimisation
Course type (lecture, seminar, exercises, practical course)	2 L – 1 S – 0 E – 1 P
Recommended literature	▪ Gebhardt, C., Praxisbuch FEM mit ANSYS Workbench: Einführung in die lineare und nichtlineare Mechanik, Carl Hanser Verlag, 2014 ▪ Lee, H.-H., Finite Element Simulations with ANSYS Workbench 14, SDC Publications, 2012 ▪ Mac Donald, B. J., Practical Stress Analysis with Finite Elements, GLASNEVIN Publishing, 2011
Learning materials	hand-outs supporting lecture and tutorial contents
Method(s) of instruction/ media being used	Lecture and practical course (tutorials)
Level/ category	Master (category: 2)
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance, necessary knowledge	Introduction into Finite-Elements-Method
Assessment (written/ oral test, paper, etc.)	alternative examination course achievement: successful attendance of practical course
ECTS credits	6
Work load in:	180 h of total work load, therefrom ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	Advanced 3D-Design
Frequency of offer	Every study year
Duration of module	1 semester
Place/ room	Ernst-Abbe-Hochschule Jena - University of Applied Sciences Jena
Time	According to schedule
Language(s)	English