At a glance

Target group	Engineers with professional experience in the field of mechanical engineering, civil engineering or related fields, who wish to deepen their knowledge in simulation based engineering
Lecturers	Outstanding specialists from academia and industry with profound applied expertise
Format	Career-integrated study program with in-person and self-study phases Total approx. 45 in-person seminar days in Ingolstadt or Landshut
Program duration	The program can usually be accomplished within 4 semesters
Teaching language	English
Degree earned	Master of Engineering (M. Eng.)
Module studies	select individual modules to deepen specific expert knowledge within 6 months
Admission requirements	- University degree (Bachelor, Master, Diplom) in engineering or natural sciences - At least one year of professional experience in the field of engineering or natural sciences - Proficiency in English
Cooperation partners	Technische Hochschule Ingolstadt Hochschule Landshut – University of Applied Sciences CADFEM GmbH (esocaet studies)

For further information and registration: www.thi.de/iaw

Contact and information

Cooperation partners

The Master's program Simulation Based Engineering (M. Eng.) was founded in 2005 and has been adapted to current developments since then. All three partners, Technische Hochschule Ingolstadt, Hochschule Landshut, and CADFEM GmbH jointly conceived the contents of the study course. This Public-Private-Partnership ensures a strong connection to the real needs of companies and their employed professionals.

We are happy to answer your questions. Please do not hesitate to contact us for further information.

Technische Hochschule Ingolstadt (THI) - Institut für Akademische Weiterbildung (IAW)
Esplanade 10, 85049 Ingolstadt
Volker Stieg
Volker.Stieg@thi.de
+49 841 9348-6400

Hochschule Landshut – Institut für Weiterbildung
Am Lurzenhof 1, 84036 Landshut
Brigitte Oberweger
brigitte.oberweger@haw-landshut.de
+49 871 506-461

CADFEM GmbH – esocaet Studies
Marktplatz 2, 85567 Grafing b. München
Nicolas Beck
nbeck@cadfem.de
+49 8092 7005-834

www.cadfem.net

Technische Hochschule Ingolstadt
Institut für Akademische Weiterbildung

esocaet STUDIES

Hochschule Landshut

Technische Hochschule Ingolstadt

Master

career-integrated study program

Simulation Based Engineering

Simulation Based Engineering (M.Eng.)

Simulation-based engineering will be one of the key technologies for the years ahead. Experts in this field are more sought-after than ever, thanks to the complete digitization of product lifecycles. And in the course of Industry 4.0, new challenging and interesting fields of activity are constantly emerging.

Use of simulation and digital twins contributes decisively to shortening and optimizing product development cycles in many fields of industry and research. This saves both money and time, which would have been spent on physical test runs, while leading to better products.

The part-time course with the perfect mix of theory, applied knowledge and professional exchange opens new perspectives to designers, developers and computational engineers. With a high level of competence in engineering simulation, you are qualified to work in various industries.

Study course objectives

- Enhance your expertise in the theory and application of FEM and simulation methods
- Master new challenges you are facing on your job right from the beginning of the program
- Gain more confidence to make decisions for better product development

Your opportunity as an employee

- Network and exchange with experts and professionals in your field
- Earn an internationally recognized academic degree
- Open a wide range of new career perspectives, from manager at your firm to leading expert in your field

Your opportunity as a company

- Strategically develop your expertise in relevant business areas
- Safeguarding against a deficit of specialists
- Increase you employees' satisfaction

Module overview

1 Mathematics and Computational Methods
- Numerical solution of linear and nonlinear systems of equations
- Numerical discretization, ordinary and partial differential equations
- Tensors; Fourier analysis; curve, surface and volume integration

2 Solid Mechanics
- Stress state, deformation and strain state
- Plane, torsion and plate problems
- Energy principles

3 Finite Element Method
- The principle of virtual work, basic elements
- Bars and beams, plates and shells
- FEM in the product development process

4 Materials and Material Models
- Classification of materials, introduction to material models
- Viscoelasticity; plasticity; computational aspects
- Composites

5 Computational Dynamics
- Kinematics and dynamics of deformable bodies
- Modal, harmonic response and transient analysis
- Time integration algorithms,validation with experimentation

6 Project Work
- Solving an actual complex problem in a team
- Topics in the area of applied research, product or manufacturing development
- Applications of analytical, numerical and/or experimental methods

7 + 8 Choose 2 out of 12 elective Modules

Fatigue and Fracture / Scientific Programming / Modeling Techniques /Optimization and Robust Design / Acoustics / Multibody Systems / Product Development and Manufacturing Processes / Mechatronics /Experimental Validation / Computational Fluid Dynamics in Practice / Fluid Dynamics and Heat Transfer/ Simulation: State-of-the-Art and Scientific Writing

9 Geometrically Nonlinear and Contact Analysis
- Large deformations, large strains
- Contact analysis
- Theory of stability, numerical solution procedures

10 Master thesis and final colloquium

Study course concept

The career-integrated Master's program offers valuable opportunities to advance professional development. In addition to a salaried professional activity, attendees will acquire further knowledge and networks with lecturers and like-minded people. The program is tailored to the individual needs of the participants:

- Face to face seminars take place Thursday/Friday through Saturday
- The self-study phases provide flexibility in terms of time and location
- Case studies enable a practice-orientated competence acquisition
- Newly acquired knowledge is transferred into your own professional environment