Technische Hochschule Ingolstadt

+

Institut für Akademische Weiterbildung

M. Eng. Applied Computational Mechanics

Simulation Based Engineering Sciences

Career-integrated study program



- I. IAW Introduction to Institute for Executive Education
- II. Details about ACM
- III. Studying in a career-integrated study program



Program partners Overview



Technische Hochschule Ingolstadt (leading university)

- 42 study programs, ~ 5.500 students
- Core competences in the area of technology and economy
- 3 faculties (Business School, Mechanical Engineering, Electrical Engineering)

Hochschule für angewandte Wissenschaften Landshut

- 30 study programs, ~ 5.400 students
- 6 faculties (Business Economics, Electrical Engineering, Computer Sciences, Mechanical

Engineering, Social Work, Interdisciplinary Studies)

CADFEM GmbH (esocaet)

- One of Europe's biggest providers of simulation technology
- 185 employees (in the CAE business, ~ 250 worldwide)
- CADFEM esocaet imparts simulation know-how at first hand

Institute for Executive Education (IAW) Overview



Established in 2008

Combines all activities in the field of executive education at THI

- Career-integrated study programs
- Career-integrated further education

Comprehensive educational research

- Offene Hochschule Oberbayern (OHO)
- "Schaufenster Elektromobilität" (Showcase

Electric Mobility)

"Netzwerk Qualifizierung Elektromobilität" (Network Qualification Electric Mobility)



education-to-employment (E2E)



- Schedule meets the needs of professional workers.
- Efficient studying experience due to small student groups.
- Highly qualified professors and lecturers support participants to expand their expertise.
- Application oriented competence
 transfer allows participants to improve
 their occupational and social skills.



Our claim Your future expertise



Methodological competencies Social competence With our taylored study courses, the focus is placed on Specialist the implementation competence of scientific insight into professional Self practice competence

With ACM, you lay the foundation for your further personal and professional development. You will acquire knowledge and skills in order to be successful and to act in a socially responsible manner.



- The Institute for Executive Education is a officially system-accredited unit withinTHI
- The accreditation is based on a comprehensive quality management system, which ensures sustainable quality assurance and advancement.

The accreditation of our educational offers allows comparability to other National and European Higher Education Area programs.

The system accreditation certifies a high quality standard in research and teaching and it ensures

- the studiability for professionals.
- highly transparent processes.
- committed support and assistance.

SYSTEMAKKREDITIERT



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M. Eng. Applied Computational Mechanics Key data



M. Eng. Applied Computational Mechanics						
Academic degree:	Master of Engineering, M. Eng. (Cooperate degree THI and HAW)					
Expected start:	Winter Term 2019/20 (September/October)					
Standard period of study:	5 Semesters					
Duration of study:	Usually 4 semesters					
ECTS credit points:	90 CP					
Language:	English					
Director of studies:	Prof. Dr. Jiri Horak (THI) / Prof. Dr. Bernhard Gubanka (HAW Landshut)					
Admission requirements:	University degree, 1 year of work experience, proficiency in English B2 and German A1					
Application deadline:	15.07.2019 (for winter semester)					
Tuition fees:	Total amount € 20.000,- payable by installment (4x € 5.000,-) + administration fee/semester: € 42, -					

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Objectives

M. Eng. Applied Computational Mechanics



Students...

enhance their theoretical expertise and practical skills in the area of FEM and related topics.

master new simulation challenges on their job from the very beginning of the course.

hone their social competences by learning in an international environment.



Target group

M. Eng. Applied Computational Mechanics



Graduates...

- with a first academic degree in the field of engineering, natural sciences or other related subjects.
- with qualified work experience (at least
 1 year) in the field of engineering or
 natural sciences, which has to be
 acquired <u>after</u> the first academic degree.
- with sufficient English skills (B 2
 according to the Common European
 Framework of Reference for Languages)
 and German skills (A 1).



Curriculum



5. Semester (30 ECTS)	Master thesis						
4. Semester (15 ECTS)	Elective Module 1	Elective Module 2	Geometrically Nonlinear and ContactAnalysis				
3. Semester (15 ECTS)	Materials and Material Models	Computational Dynamics	Project				
2. Semester (15 ECTS)	Mathematics and Computational Methods	Solid Mechanics	Finite Element Method				
1. Semester* (15 ECTS)	Applied Methods in Simulation-Based Engineering	Specific Methodological Competencies	Self-Competence and Social Competence at the Workplace				

* The modules of the first semester stated in the Appendix of the SPO (study and examination regulations) can be credited under consideration of the basic principle of Art. 63 BayHSchG.

Module content (I) Overview



Module	Content	Exam			
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 	Written Exam			
Solid Mechanics	 Solid Mechanics Stress state, deformation and strain state Plane, torsion and plate problems Energy principles 				
Finite Element Method	 The principle of virtual work, basic elements Bars and beams, plates and shells FEM in the product development process 	Written Exam			
Materials and Material Models	 Classification of materials, introduction to material models Viscoelasticity; plasticity; computational aspects Composites 	Written Exam			
Computational Dynamics	 Resonance and damping, machine dynamics Experimental dynamic analysis; response analysis based on the given load Numerical simulation; modal analysis; reduction methods 	Written Exam			
Project	 Solving an actual complex problem in a team Topics in the area of applied research, product or manufacturing development Using analytical, numerical and/or experimental methods 	Project Thesis			

Module content (II)

Overview



Module	Content					
Elective Module: Fatigue and Fracture	 Cyclic behavior of materials; fatigue tests and fatigue data evaluation Lifetime estimation, introduction to guidelines Linear elastic fracture mechanics, elastic-plastic fracture mechanics; cracks 	Written Exam				
Elective Module: Scientific Programming	 Numerical computing environments and programming languages in engineering sciences Algorithm development based on mathematical methods Symbolic versus numerical computation 	Student Research Paper				
Elective Module: Optimization and Robust Design	 Penalty methods, response surface methods, adaptive strategies Evolutionary strategies, genetic algorithms, Pareto optimization strategies Robust design optimization, applications 	Oral Exam				
Elective Module: Modeling Techniques	 Advanced modeling techniques, choosing an appropriate approach Mesh-morphing techniques, reduced order modeling Treatment of constraints, exploiting symmetry 					
Elective Module: Acoustics	 Elective Module: Acoustics Wave equation, analytical solutions; numerical methods Sound radiation; reflection, diffraction, scattering of acoustic waves; plane waves Fluid-structure interaction, coupled systems, coupling of computational methods 					
Elective Module: Multibody Systems	 Spatial kinematics, spatial kinetics Newton-Euler and Lagrange's equations, non-smooth dynamics Numerical simulation methods and applications 	Written Exam				

Module content (III)

Overview



Module	Content	Exam			
Elective Module: Product Development and Management Processes	 Manufacturing processes; collaborative and simultaneous engineering Product data management; virtual engineering Industrial engineering; production systems; manufacturing strategies 	Seminar Paper			
Elective Module: Experimental Validation	 Experimental techniques: measurement of physical quantities Numerical and experimental limitations; boundary and initial conditions Practical exercises combining numerical and experimental methods 	Practical Exam			
Elective Module: Mechatronics	Elective Module: Mechatronics • Fundamentals of field theory, boundary conditions, field coupling • Components of mechatronic systems • Description and simulation of actuators; control				
Elective Module: Fluid Dynamics and Heat Transfer	 Conservation laws describing motion of fluids; turbulence modeling Numerical methods and their implementation Best practice: evaluation of simulation quality, identification of error sources 	Written Exam			
Elective Module: Simulation: State-of- the-Art in Industry and Science	 Attendance of a scientific meeting with presentations on advanced simulation techniques Discussion of the presented topics Writing a scientific paper on a given topic, presentation 	Student Research Paper			
Compulsory Elective Module: Computational Fluid Dynamics in Practice	 Boundary layer, flow separation Vortex flow Characteristics of turbulent flows, instabilities; scales, energy cascade, Kolmogorov hypothesis 	Project Thesis			

Module content (IV)

Overview



Module	Content	Exam
Geometrically Nonlinear and Contact Analysis	 Geometrically nonlinear phenomena in structural mechanics Contact phenomena, contact detection, contact forces Stability and convergence issues; application of commercial software 	Written examination
Master Thesis	Including Colloquium	

Admission requirements





Application

Online application on www.thi.de





Studierende

Termine

Kellerhals-Stiftung

18112016 1615 - 1700 Uhr

Thomas Grauschoof

24112015 12:30 - 16:15 Ubr

Weitere Termine

ester 2017.

Kinderuni 2016: 4. Varlesung

Frage nach, was räumliches Sehen ist.

Wr untersuchen danach anhand, mehr

Anrechnungswerkstatt - Stand und

außerhochschulischer Kompetenzen

Vorsicht Baustellel Wir laden ein zur .Anrechnungswerkstatt' an der

Technischen Hochschule Ingolstadt. Neben Kurzinputs zu der Gestaltung von Anrechnungsverfahren... mehr

Perspektiven der Anrechnung

18112016

Aktuelles

Studieninteressierte



Start Studienplatzbewerbung für das Sommersemester 2017

Am Dienstag, den 1511.2016 startet die Studienplatzbewerbung für das Sommersemester 2017. Die Bewerbung erfolgt ausschließlich Online über folgenden N Link oder die beiden Buttons s.u. die direkt zu Infos für angehende Bachelor-oder Masterstudierende führen. Auf der aktuell optimierten Plattform werden Bewerbung und Kommunikation individuell auf den einzelnen Bewerber zugeschnitten und weitgehend digital abgewickelt. Bewerber sehen iederzeit den Bearbeitungsstand ihrer Bewerbung und erhalten auf der Plattform zeitnah Rückmeldung zu allen offenen Punkten

Mit einem Klick zur Bachelor-Bewerbung

Mit einem Klick zur Master-Bewerbung



Unternehmen & Partner

08112016 Kostenloser Kulturgenuss für THI-Studierende Räumliches Sehen - Werum der Pirat Kooperation mit dem Stadttheater

lleber aus der Flasche trinkt Ingoistadt mehr 16.15-17 Uhr in E003 mit Prof. Dr. 04 11 2015 In der Vorlesung gehen wir zunächst der

Infoabend zu berufsbegleitenden Bachelor- und Master-/MBA-Studiengängen

Das Institut für Akademische Weiterbildung lädt ein mehr Weitere Pressemitteilungen

Application deadline:

- For summer term: Nov 15 – Jan 15
- For winter term: May 2 - July 15

The online application tool allows:

- application for all IAW study programs
- uploading of required documents
- information about the current application status

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Application CADFEM esocaet candidate program



CADFEM esocaet candidate program

- building blocks for your individual preparation

- Application check list
- Offers for **English** as language of study:
 - Placement test
 - Intensive courses
 - English certificate B2 exams
- Mathematics refresher course
 - Online learning course
- Simulation module for beginners
 - Complete modules for creditation
- Introduction to simulation software tools



Sign up at:

www.esocaet.com/studies/thi-hl/bewerberprogramm



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Studying in a career-integrated study program Organization



The **study concept** meets the needs of enterprises and employees: lessons and self-study alternate during the course of the semester.

A **module** normally contains 5 in-person days. They take place on Thursday/Friday to Saturday.

The **self-study phases** provide flexibility in terms of time and location.

Documents for the lectures are offered to the participants via the interactive learning platform *Moodle*.



Studying in a career-integrated study program

Attendance during the semester



Attendance:

- Five days per module
- 15 days per semester
- Lectures usually take place on weekends (Friday, Saturday, partly on Thursday) at the THI & the HAW. You will have lectures from 8.00 – 12.30 o'clock

and

from 13.30 - 18.00 o'clock

Semester break:

Usually no lectures during
 Bavarian school holidays

January				February					
	module	professor	room				module	professor	room
1					1				
2					2				
3				8	3				
4				3	4				
- 5				ΰ	5				
6					6				
7					- 7				
8					8				
9					9				4
10					10				<u> </u>
11				N O	11				
12				Ö	12				
13				1	13				
14				1	14				
	SolidMech 08:00 - 12:30	Prof. Huber			15				
15	FEM 13:30 - 18:00	Prof. Dallner	TI 103						
16	SolidMech 08:00 - 12:30	Prof. Huber			16				
10	SolidMech 13:30 - 18:00	Prof. Huber	TI 103						
17					17				
18				6	18				
19				S		Examina 09:30 - 1	ition SolidMech 1:00	Prof. Huber	B108
					19				B108/
						FEM	13:30 - 18:00	Prof. Dallner	C105
									B108/
20					20	FEM	08:00 - 12:30	Prof. Dallner	C105
21					21				<u> </u>
22					22				_
23					23				_
24	1			92	24				

Quality management

Regular evaluations and quality management circles take place at IAW to guarantee the quality within the study programs.

- Freshman survey at the beginning of a study program
- Evaluations of every single module during the study program retrieving satisfaction with teaching content, didactics, methods and practice-orientation
- Annual student surveys to evaluate student satisfaction with equipment, support and organization of their program
 Annual quality circles for student feedback
- Alumni surveys test satisfaction after graduation
- Every second year, IAW holds quality circles for professors and lecturers to enable exchange of information regarding the study program
- Company workshops and interviews ensure state-of-theart content





Study funding



Funding opportunities for career-integrated studies:

Scholarships

There are some scholarships, which you might be eligible for. Comprehensive scholarship data banks: <u>www.mystipendium.de</u> and www.stipendienlotse.de

Tax reduction

Studying can reduce your individual tax load. For detailed information, please contact your tax accountant.

Support of the employer

Many companies support employees taking a career-integrated study program by providing some time off from work or by offering individual financial support. Approach your employer in time. Your contact Directors of studies



Technische Hochschule Ingolstadt Institut für Akademische Weiterbildung (IAW) Esplanade 10 85049 Ingolstadt **Prof. Dr. Jiří Horák** TH Ingolstadt, Fakultät Maschinenbau

Phone: +49 / (0)841 / 9348-3021 E-mail: jiri.horak@thi.de

Hochschule für angewandte Wissenschaften Landshut Institut für Weiterbildung Am Lurzenhof 1 84036 Landshut

Prof. Dr. Bernhard Gubanka HAW Landshut, Fakultät Maschinenbau

Phone: +49 / (0)871 / 506-213 E-mail: bernhard.gubanka@hawlandshut.de Your contact

Organization, matriculation



Technische Hochschule Ingolstadt

Institut für Akademische Weiterbildung (IAW) Esplanade 10 85049 Ingolstadt

Programme Manager:

Kerstin Steidle Institut für Akademische Weiterbildung

Phone: +49 / (0)841 / 9348-1511 E-mail: <u>kerstin.steidle@thi.de</u>

Responsibilities:

- Organizational issues THI
- Matriculation at THI

Your contact Organization



CADFEM GmbH

esocaet

Marktplatz 2

85567 Grafing b. München

http://www.esocaet.com/

Hochschule für angewandte Wissenschaften

Landshut

Institut für Weiterbildung

Am Lurzenhof 1

84036 Landshut

Nicolas Beck CADFEM esocaet

Phone: +49 / (0)8092 / 7005-834 E-mail: <u>NBeck@cadfem.de</u>

Responsibilities:

- general organizational issues
- Support during the application process

Brigitte Oberweger HAW Landshut, Institut für Weiterbildung

Phone: +49 / (0)8 71 506-461 E-mail: <u>Brigitte.Oberweger@haw-</u> landshut.de

Responsibilities:

Organizational issues HAW
 Landshut