

Study and Examination Regulations for the Master's Degree Programme in  
"Applied Computational Mechanics"  
of the Fachhochschule Ingolstadt and Fachhochschule Landshut

Dated January 23, 2008

The following is a translation of the official *Studien- und Prüfungsordnung für den Masterstudiengang "Applied Computational Mechanics"*. Please note that only German version is legally binding.

In accordance with § 13 paragraph 1 sentence 2, § 58 paragraph 1 sentence 1, § 61 paragraph 2 sentence 1 and § 43 paragraph 5 sentence 2 of the Bavarian Law on Higher Education (*Bayer. Hochschulgesetzes, BayHSchG*) from May 23<sup>rd</sup> 2006 (GVBl S. 245, BayRS 2210-1-1-WFK) the Universities of Applied Sciences Ingolstadt and Landshut issue the following statute:

## § 1

### **Institution Administering the Graduate Studies**

The graduate Master's degree program in "Applied Computational Mechanics" is administered conjointly by the two Universities of Applied Sciences, Fachhochschule Ingolstadt and Fachhochschule Landshut.

## § 2

### **Educational Objectives of the Programme**

<sup>1</sup>The objectives of the graduate Master's degree programme in "Applied Computational Mechanics" are to provide the participant, building on already obtained academic degrees and professional experience, with practically oriented career-parallel specialisation in the area of computer simulation techniques, management skills and a distinctive process thinking. <sup>2</sup>Beside the necessary specialisation in physical and mathematical basic subjects, the training programme concentrates on the application of numerical solution techniques, using professional software tools in modern product development and manufacturing processes. <sup>3</sup>Graduates are enabled to understand and shape development and production processes in a complex environment and to develop innovative products and technologies, using modern methods and instruments. <sup>4</sup>Besides specialist and methodical knowledge, participants acquire knowledge spanning across subjects, management skills and social competences, enabling them to execute and manage development projects independently or as team member. <sup>5</sup>Graduates are empowered to accept highly demanding tasks as responsible managers in the national and international domain of production enterprises and service institutions.

### § 3 Admission Requirements

(1) <sup>1</sup>The qualification requirements for the admission to the graduate Master's degree programme are

1. a degree in the area of Engineering or Natural Sciences from a German university/institution of higher education or from a Berufsakademie (university of cooperative education) in accordance with the concept of the University of Cooperative Education in the state Baden-Württemberg with an overall rating of "good" or higher (minimum overall rating 2,5 in accordance with § 7 paragraph 5 Examination Regulations Framework – *Rahmenprüfungsordnung, RaPO*) or an equivalent degree from a foreign university. Proof of qualification shall be made by submission of the graduation certificate. The examination commission for the Master's degree programme determines the equivalency of individual degrees from institutions of higher education. Equivalency is provided when the duration of study, achieved study results and examination results correspond in content, scope and requirements to a course of study in the area of Engineering or Natural Sciences on a German university/institution of higher education. Although, no schematic comparison of curricula is to be made, but a comprehensive examination and overall assessment.

An overall rating of >2,5 can be partially compensated when the applicant has worked for at least three consecutive years in a relevant field of work with outstanding achievements, or has achieved outstanding results in a relevant further training (certificate has to correspond to Bachelor's degree or higher) with a scope of min. 20 ECTS. Certificates are to be provided for proof. The overall rating of the equivalent qualification has a weight with the ratio of 1:1 to the overall rating of the academic degree. The resulting overall rating has to produce an overall rating of  $\leq 2,5$  for admission to the Master's degree programme. The decision will be made by the examination commission.

2. professional experience in the field of Engineering or Natural Sciences of at least two years after obtaining the university degree. Exception to the two-year professional experience can be made when the applicant has been employed for at least one year in a field of work concerned with CAE, and the employer states that the applicant will be employed for another year in a relevant field of work. The decision will be made by the examination commission.
3. to pass an aptitude test for the Master's programme in "Applied Computational Mechanics" in accordance with § 4.
4. proficiency in English, proven by a Test of English as a Foreign Language (TOEFL) with a score of at least 550 or a computer-based TOEFL score of at least 213 or an internet-based TOEFL score of at least 80, or equivalent evidence. The necessary qualification can also be demonstrated during a selection interview, for which the examination commission will be in charge. Proof of proficiency is not necessary when the applicant holds a university entrance certificate or university degree acquired in English, or the applicant holds citizenship of a country in which English is official language.

<sup>2</sup>The requirements stated above have to be produced accumulatively.

- (2) Admission to the Master's degree programme requires the signing of an agreement on the realisation of the postgraduate course between the participant and the institutions administering the studies.
- (3) In case of non-admission the applicant shall receive a written explanatory statement.

#### **§ 4 Aptitude Test**

- (1) <sup>1</sup>For the realisation of the aptitude test (in accordance with article 43 paragraph 5 sentence 2 BayHSchG), a commission shall be formed, consisting of two full-time professors, one of each institution administering the studies. <sup>2</sup>The two professors forming the commission shall be appointed by the respective faculty councils.
- (2) <sup>1</sup>Admission to the aptitude test requires the submission of the following documents within the stated application period:
  - a) curriculum vitae and certificates (original document or legally certified copy) of academic degree and professional experience in German or in English, and
  - b) a two-page (DIN-A4) letter of motivation, stating the applicant's aptitude and the reason for choosing the Master's degree programme in "Applied Computational Mechanics" in German or in English.<sup>2</sup>The documents have to be accompanied by a written statement of the candidate, stating that he/she has written the papers himself/herself and has not used sources and aids other than those listed and has identified all quotations (literal and analogous quotations) in an appropriate manner. <sup>3</sup>Additionally, they are to be signed by the candidate.
- (3) Decision on admission to the aptitude test will be made by the examination commission.
- (4) <sup>1</sup>Proof of aptitude consists of the following:
  - a) 30 %: evaluation of the documents submitted in accordance with paragraph 2 lit. a) and b) of previous experience, content, form, expressiveness, presentation and argumentation skills, and
  - b) 70 %: interview of 30 minutes, during which the following competences shall be assessed: specialist knowledge in Engineering and Natural Sciences, ability to explain technical facts comprehensibly, capacity for abstraction, capability for interdisciplinary, structured and analytical thinking as well as ability to communicate, problem recognition and problem solving.

<sup>2</sup>The candidate's aptitude is proven with an overall test result of at least adequate. <sup>3</sup>The grading shall be made in accordance with the grading scale stipulated in § 7 paragraph 5 Examination Regulations Framework – *Rahmenprüfungsordnung (RaPO)*.

- (5) <sup>1</sup>The applicant will receive the result of the aptitude test in writing. <sup>2</sup>In case of non-admission, the reason for not accepting a candidate has to be stated and information on legal remedies has to be included. <sup>3</sup>For candidates who have failed the aptitude test, the earliest date to retake the aptitude test is the scheduled date in the following year. <sup>4</sup>Further repetition is not allowed.
- (6) In accordance with paragraph 5 sentence 3 the result of a passed aptitude test remains valid for the enrolment date immediately after the aptitude test and for the matriculation periods for the next two years of study.

## **§ 5 Duration of Study**

<sup>1</sup>The standard duration of study is four theoretical semesters. <sup>2</sup>This is equivalent to three full-time semesters and hence 90 ECTS credit points (European Credit Transfer and Accumulation System).

## **§ 6 Modules and Certificate of Academic Achievement**

- (1) <sup>1</sup>The modules, the course hours, the course type, as well as examinations and evidence of academic achievement (*Leistungsnachweis*) and their respective weight for the overall examination mark are stipulated in appendix 1 to this statute. <sup>2</sup>As far as various course types are scheduled for a module, the final regulation shall be established in the study plan.
- (2) All courses and modules are either compulsory or elective courses:
1. Compulsory courses are those courses of the Master's degree programme, which are mandatory for all participants.
  2. Elective courses offer an alternative of subjects. In accordance with the Study and Examination Regulations, the participant has to choose a certain amount of elective courses. The chosen elective courses shall be treated as compulsory courses.
- (3) Teaching and examination in all modules and courses will be held in English.

## **§ 7 Study Plan**

- (1) <sup>1</sup>To guarantee the scope of teaching and for the information of the participants, the faculties of the institutions administering the studies shall establish a study plan, which is not part of the Study and Examination Regulations. <sup>2</sup>The study plan determines the course of study in detail. <sup>3</sup>The study plan will be posted and made public in both Universities of Applied Sciences. <sup>4</sup>New regulations have to be made public at the latest at the start of the new semester, for which they are intended.

- (2) In particular the study plan shall provide information and regulations concerning the following:
- the schedule of course hours per module and semester
  - aim and content of the individual modules
  - further regulations concerning evidence of academic achievement (*Leistungsnachweis*) acquired during the course of study
  - a list of the elective courses in “Advanced Simulation Techniques“ with a description and details about the number of course hours

## **§ 8 Examination Commission**

- (1) <sup>1</sup>For the Master’s degree programme an examination commission shall be formed. It shall consist of three full-time professors of the institutions administering the Master’s degree programme. <sup>2</sup>The chairman and the other members of the examination commission shall be appointed for a period of three years by the respective faculty councils.
- (2) The examination commission shall also perform the duties of the examination board.

## **§ 9 Master’s Thesis**

- (1) <sup>1</sup>To obtain the Master’s degree, the participant has to write a Master’s thesis. <sup>2</sup>The objective of the Master’s thesis is to prove the candidate’s ability to apply the knowledge acquired during the studies in a complex assignment in the area of applied research or practice independently and with scientific methods.
- (2) <sup>1</sup>The latest date for issuing a topic of the Master’s thesis shall be at the start of the 4<sup>th</sup> semester. <sup>2</sup>Prerequisite for issuing a topic is that the participant has already acquired 37 ECTS credit points.
- (3) <sup>1</sup>The period of time allotted to the completion of the Master’s thesis, from issuing the topic to delivering the Master’s thesis, shall be adequately chosen for the scope of the topic and must not exceed six month. <sup>2</sup>Due to adequate reasons, an extension of a maximum of two month can be granted following the submission of a petition.
- (4) For the completion of the Master’s thesis, in addition to § 11 of the General Examination Regulations (*Allgemeinen Prüfungsordnung*) of the Fachhochschule Landshut, the following regulations apply:
1. The Master’s thesis shall be distributed ex officio not later than three month after the completion of the last final examination, should the participant not already have applied for appointment of an examiner nor proposed his/her own preferred topic for the Master’s thesis.
  2. Three bound copies of the Master’s thesis, and additionally one copy in electronic form, shall be handed in to one of the authorised offices. The ex-

amination commission is entitled to issue formal guidelines for the Master's thesis.

## **§ 10**

### **Examinations, Dates and Deadlines**

- (1) Examinations shall be held soon after the end of a module/course.
- (2) <sup>1</sup>Registration for examinations or achievement certifications (*Leistungsnachweise*) is not required. <sup>2</sup>In accordance with the participant's progress in the course of study, he/she is entitled to participate in all examinations and achievement certifications of the Master's degree programme.
- (3) The examination commission shall announce and make public not later than two weeks after the start of the lecturing period the examination dates of the respective semester. The date for examination re-sits shall be announced within a similar period of time, close to the grade disclosure.
- (4) At least two weeks before the scheduled examination date, the examination commission shall publicly announce in the institutions administering the studies the name of the examiner, location of examination and the allowed auxiliary means for the individual courses in a separate examination plan.
- (5) <sup>1</sup>All examinations and the Master's thesis shall be completed by the fourth semester, or at least the first attempt shall have been made. <sup>2</sup>By that time, all certificates of academic achievement, which have a weight for the overall rating, have to be completed or attempted for the first time. <sup>3</sup>In case of a necessary exceedance of the stipulated time, the participant has to submit a request for extension to the examinations office at the latest four weeks after he/she has received notification about the expiry date.
- (6) If the participant, for a reason he/she can act for, has exceeded a time-limit stated in paragraph 5 by more than one semester, the certificate of academic achievement shall be announced attended and not passed for the first time.

## **§ 11**

### **Assessment of Examination Performance, Overall Examination Result**

- (1) To allow finer differentiation, examination grades may be raised or lowered by 0,3 points; the grades 0,7, 4,3, 4,7 and 5,3 are excluded.
- (2) <sup>1</sup>The overall examination result is composed of the final examination results from all modules in accordance with the weight of grades stated in appendix 1. <sup>2</sup>In compliance with § 11 paragraph 2 sentence 1 Examinations Regulations Framework (*RaPO*), the calculation of the overall examination result is not based on the final examination results, but on the grading scale for the overall assessment (added in brackets).

## **§ 12**

### **Master's Degree Examination Certificate**

- (1) A passed final examination shall be documented by an Examination Certificate in accordance with the template given in appendix 2.
- (2) The final mark of the Master's examination and the marks of the Master's thesis shall be displayed in the Master's Degree Examination Certificate as well with a differentiated assessment (added in brackets) in accordance with § 7 paragraph 2 sentence 3 Examination Regulations Framework (*RaPO*).
- (3) Graduates will receive together with the Master's Degree Examination Certificate a Diploma Supplement in accordance with the template given in appendix 3.

## **§ 13**

### **Academic Degree**

- (1) Upon successful completion of the Master's examination, graduates will be awarded the academic degree "Master of Engineering" (abbr. M.Eng.).
- (2) <sup>1</sup>The graduate will be issued a Master's Degree Certificate in accordance with the template given in appendix 4. <sup>2</sup>The certificate must be signed by the presidents of the institutions administering the studies.

## **§ 14**

### **Additional Regulations**

- (1) As far as this statute does not state anything on the contrary, the Examination Regulations Framework for Universities of Applied Sciences in Bavaria (*Rahmenprüfungsordnung für die Fachhochschulen in Bayern*) from October 17<sup>th</sup> 2001 (GVBl S. 686) and the General Examination Regulations (*Allgemeine Prüfungsordnung*) of the Fachhochschule Landshut are effective in their respective relevant version.
- (2) <sup>1</sup>The semester schedule is conforming to the regulation on semester breaks, lecture and examination periods at Universities of Applied Sciences in Bavaria (GVBl S. 797, BayRS 2210-1-6-2 WFK) from October 10<sup>th</sup> 1983 in the relevant version. <sup>2</sup>The semester schedule can vary up to one month from the date stated in the regulation. <sup>3</sup>Apart from that, the regulation does not apply.

## **§ 15**

### **Enactment**

<sup>1</sup>The Study and Examination Regulations come into effect on September 17<sup>th</sup> 2007. <sup>2</sup>For participants enrolled in the winter semester 2007/2008, §§ 3 and 4 do not apply, but § 3 of the Study and Examination Regulations for the Master's degree programme "Applied Computational Mechanics" of the Fachhochschule Ingolstadt and Fachhochschule Landshut from September 29<sup>th</sup> 2005. <sup>3</sup>For participants enrolled in

the Master's degree programme before the winter semester 2007/2008, the Study and Examination Regulations for the Master's degree programme "Applied Computational Mechanics" of the Fachhochschule Ingolstadt and Fachhochschule Landshut from September 29<sup>th</sup> 2005 apply likewise. <sup>4</sup>Other than that the Study and Examination Regulations expire on September 16<sup>th</sup> 2007.

**Appendix 1** to the Study and Examination Regulations for the graduate Master's degree programme "Applied Computational Mechanics"

1	2	3	4	5	6	7	8
Course No.	Module	Course hours	Course Type	Type of Examination and Duration in Minutes	Academic Achievements other than Exams with weight for the Final Grade <sup>1)</sup>	Weight of Grades	ECTS Credit Points
1	Mathematics	40	SU, Ü	schrP 90		1	4
2	Numerical Methods in Engineering	70	SU, Ü	schrP 120		2	8
3	Solid Mechanics and Heat Transfer	60	SU, Ü	schrP 120		2	7
4	Fatigue and Fracture Mechanics	40	SU, Ü	schrP 90		1	4
5	Computational Dynamics	70	SU, Ü	schrP 120		2	7
6	Nonlinear Computational Mechanics	70	SU, Ü	schrP 120		2	7
7	Basics in Multiphysics	70	SU, Ü	schrP 120		2	7
8	Advanced Simulation Techniques						
8a	Seminar Simulation Techniques	20	SU		Ref 2 <sup>2)</sup>	1	3
8b	Elective Courses in Advanced Simulation Techniques	40	SU		2 LN <sup>3)</sup> each 1 <sup>2)</sup>	1	4
9	Management Skills and Processes	60	SU, Ü		1 LN <sup>2)</sup> 3 <sup>3)</sup> 2 LN <sup>2)</sup> each 1 <sup>3)</sup>	2	8
10	Management of Product Development and Manufacturing Processes	60	SU, Ü	schrP 120		2	7
11	Master's Thesis					3	20
12	Presentation					1	4
	Total	600					90

<sup>1)</sup> A rating of adequate is prerequisite for obtaining the certificate of academic achievement.

<sup>2)</sup> The weighting factor for the grade determination of the module.

<sup>3)</sup> Specifics to be determined in the study plan.

**Explanation of Abbreviations:**

ECTS	European Credit Transfer and Accumulation System
LN	Certificate of Academic Achievement ( <i>Leistungsnachweis</i> )
Ref	Oral Presentation ( <i>Referat</i> )
schrP	Written Examination ( <i>schriftliche Prüfung</i> )
SU	Lecture ( <i>Seminaristischer Unterricht</i> )
Ü	Exercise ( <i>Übung</i> )



# Fachhochschule Ingolstadt Fachhochschule Landshut Universities of Applied Sciences



## Master's Degree Examination Certificate

In accordance with established guidelines

.....

born on ..... in .....

has successfully completed the Master examinations in the course of study

### Applied Computational Mechanics

with the overall evaluation of.....

Modules:

Final Mark:

ECTS-Credit Points:

\_\_\_\_\_ ( ) \_\_\_\_\_

.  
. .  
. .  
. .

Master Thesis: .....

\_\_\_\_\_ ( ) \_\_\_\_\_

Overall Examination Grade:

Date

President of  
Fachhochschule Ingolstadt

President of  
Fachhochschule Landshut

Chairman of the Examination Committee

(Seal)

(Seal)

Grading scale for the final marks  
1 = very good = 1.0 to 1.5

Overall assessments:  
passed with distinction

For a total examination mark  
of:  
1.0 to 1.2

ECTS-Grade  
A

ECTS-Definition  
EXCELLENT

2 = good  
3 = satisfactory  
4 = adequate  
5 = inadequate

= 1.6 to 2.5  
= 2.6 to 3.5  
= 3.6 to 4.0  
= over 4.0

very good  
good  
satisfactory  
pass

1.3 to 1.5  
1.6 to 2.5  
2.6 to 3.5  
3.6 to 4.0

B VERY GOOD  
C GOOD  
D SATISFACTORY  
E SUFFICIENT

## **Diploma Supplement: Applied Computational Mechanics**

### **1. HOLDER OF THE QUALIFICATION**

Mustermann, Jens

December 23th, 1975, Ingolstadt, Germany

### **2. QUALIFICATION**

**Name of Qualification** (full; in original language)

Master of Engineering in Applied Computational Mechanics

**Title Conferred** (full, abbreviated; in original language)

Master of Engineering, M.Eng.

**Main Field(s) of Study**

Engineering

**Institution Awarding the Qualification (in the original language)**

Fachhochschule Ingolstadt and Fachhochschule Landshut

**Status (Type / Control)**

Universities of Applied Sciences / State Institutions

**Institution Administering Studies**

[same]

**Status (Type / Control)**

[same]

**Language(s) of Instruction / Examination**

English

### **3. LEVEL OF THE QUALIFICATION**

**Level**

Graduate/second degree with thesis

**Official Length of Programme**

Two years of part-time study

**Admission Requirements**

Bachelor degree or Diploma degree (4-year programme) at a university or professional academy in the engineering or science sector; at least two years of relevant occupational experience after completion of the degree (in exceptional cases exemption may be granted for these two years of occupational experience if this occupational experience is accomplished in parallel with the studies); aptitude test; TOEFL (minimum score 550 paper based or 213 computer based or 80 internet based) or equivalent evidence.

### **4. CONTENT AND RESULTS GAINED**

**Mode of Study**

Part-time

**Programme Requirements / Qualification Profile of the Graduate**

The "Applied Computational Mechanics" Master course of study aims at conveying practically oriented career-parallel specialisation in the area computer simulation techniques. Besides the necessary specialisation in physical and mathematical basic subjects, the training programme concentrates on the application of numerical solution techniques, using professional software tools in modern prod-

uct development and manufacturing processes. Graduates are enabled to understand and shape development and production processes in a complex environment, as well as to develop innovative products and technologies, using modern methods and instruments. Besides specialist and methodical knowledge, students acquire knowledge spanning across subjects, management skills and social competences. The programme includes four semesters and concludes with the Master examination.

### **Programme Details**

The *Master's Degree Examination Certificate* lists the modules covered by examinations and the topic of the thesis with grades.

### **Overall Classification**

Good

cf. *Master's Degree Examination Certificate*

### **Grading Scheme**

cf. *Master's Degree Examination Certificate*

## **5. FUNCTION OF THE QUALIFICATION**

### **Access to Further Studies**

The Master's degree qualifies students to apply for admission to doctoral studies.

### **Professional Status**

The Master's degree entitles its holder to the professional title "Master of Engineering in Applied Computational Mechanics" and authorises the degree recipient to execute and manage development projects independently or as team member. This empowers to accept highly demanding tasks as responsible manager in the national and international domain of production enterprises and service institutions.

## **6. ADDITIONAL INFORMATION**

### **Additional Information**

This course of study combines theoretical and application-oriented studies.

### **Further Information Sources**

[www.fh-ingolstadt.de](http://www.fh-ingolstadt.de), [www.fh-landshut.de](http://www.fh-landshut.de), [www.esocaet.com](http://www.esocaet.com)

## **7. CERTIFICATION**

This Diploma Supplement refers to the following original documents:

*Master's Degree Certificate* November 9th, 2001

*Master's Degree Examination Certificate* November 9th, 2001

Certification Date: \_\_\_\_\_

Chairman Examination Commission

(Official Stamp/Seal)

## **8. NATIONAL HIGHER EDUCATION SYSTEM**

The information on the national higher education system on the following pages provides a context for the qualification and the type of higher education that awarded it.



**Fachhochschule Ingolstadt  
Fachhochschule Landshut  
Universities of Applied Sciences**



# Master's Degree Certificate

The  
Fachhochschulen  
Ingolstadt and Landshut  
Universities of Applied Sciences

have awarded the degree of

**Master of Engineering**  
M.Eng.

to

Surname, First name

in recognition of successful completion of an approved postgraduate programme in

**Applied Computational Mechanics**

Date

President of  
Fachhochschule Ingolstadt

President of  
Fachhochschule Landshut

(Seal)

(Seal)

Issued on the basis of the resolutions of the senate of the Fachhochschule Ingolstadt and Fachhochschule Landshut dated December 17<sup>th</sup> 2007 respectively January 22<sup>th</sup> 2008.

Ingolstadt, January 10<sup>th</sup> 2008

Landshut, January 23<sup>th</sup> 2008

signed

Professor Dr. G. Schweiger

signed

Professor Dr. E. Blum

These Regulations were set down on January 23<sup>th</sup> 2008 in the Fachhochschule Ingolstadt and Fachhochschule Landshut. The establishment was posted and made public in the Fachhochschule Ingolstadt and Landshut on January 23<sup>th</sup> 2008.

The date of publishing in the Fachhochschule Ingolstadt and Landshut is January 23<sup>th</sup> 2008.