

# **Double Degree Master Program in Mechanical Engineering/Physikalische Ingenieurwissenschaft**

of the Technische Universität Berlin

and

Tsinghua University

## **Study Regulations**

The following study regulations are drawn up in accordance with current study regulations for a degree in Engineering Science/Physikalische Ingenieurwissenschaft at the Faculty V Mechanical Engineering and Transport Systems of the Technische Universität Berlin, and the Double Degree Master Program in Mechanical Engineering Agreement between Technische Universität Berlin (TUB) and Tsinghua University (THU) on 19.09.2012

### **List of contents**

#### I. General regulations

§ I.1. Ambit

§ I.2. Course of Studies Description

§ I.3. Goals

§ I.4. Professional Fields of Activity

§ I.5. Prerequisites and Enrollment

§ I.6. Certification of Studies Length and Requirements

§ I.7. Module Catalogue

§ I.8. Credit Points

§ I.9. Classroom arrangements

#### II. Structure of Studies

§ II.1 Structure of Studies

#### III. Final clauses

§ III.1 Commencement

Attachment: Structure of Studies and Module Catalogue

## **I. General Regulations**

### **§ I.1. Ambit**

The following study regulations lay down, in connection with the examination regulations, the objectives, the content and the structure of Double Degree Master Program in Mechanical Engineering (DDMPME) of TUB and THU.

### **§ I.2. Course of Studies Description**

Based on its mathematical-physical orientation, the DDMPME course of studies prepares for activity in research and development departments at firms and other institutions.

In an atmosphere emphasizing mathematical-physical principals as well as the application of analytical, numeric and experimental methods to practically orientated engineering tasks, graduates become prepared to approach new tasks flexibly and view them holistically. The existence of several study emphases allows students to build individually unique professional profiles.

Mathematical basics as well as two strong points from the fields

- numerics and simulation
- fluid dynamics
- mechatronics
- solid state mechanics
- thermodynamics
- technical acoustics

ensure the interdisciplinary and sound scientific base of this course.

Within the scope of projects the theoretical methods will be applied on a practical basis, where team-orientated and interdisciplinary ways of working play an important role. Furthermore the students may freely choose a number of courses and in this way reinforce their personal educational profile.

### **§ I.3. Goals**

The DDMPME shall enable the students to develop mathematical-physical models for the technical systems as well as to investigate these models using the appropriate experimental, analytical and numerical methods. Thus the students should learn to recognize the standard mathematical approach to many diverse engineering issues.

On this basis goal-orientated solutions can be worked out by the students and integrated into complex systems by interdisciplinary teams. The independent way of scientific approach is imparted to the students during the studies, so that they may successfully analyze and work on innovative problem definitions in increasingly complex technical world.

A close connection between research and theory enables the students to learn to apply the latest research findings in engineering, supporting a project and team related way of working.

The students learn to act responsibly as well as investigate and assess critically their own and the others' work.

The ability to impart specialist information in an interdisciplinary setting shall also be developed. The DDMPME offers students a strong foundation to be built upon by lifelong learning in the workplace.

#### **§ I.4. Professional Fields of Activity**

Through the combination of basic knowledge, methodical competence and interdisciplinary study the graduates are excellently prepared for work in research and development.

The operational area spans all trades where the innovative solutions and the latest scientific discoveries are gained and implemented into the products and services, e. g. automotive technology, aeronautical engineering, environment engineering, maritime systems, mechanical engineering and construction, energy economy, process engineering, bioengineering, medical technology, micro-mechanics and precision engineering.

#### **§ I.5. Prerequisites and Enrollment**

Following conditions must be fulfilled to enroll in the DDMPME:

a) Chinese students:

- (1) Four year bachelor at THU or other Chinese University of Technology in Mechanical Engineering or other relevant course of studies.
- (2) Knowledge of German language of the medium level in accordance with the Goethe-Institute (Zentrale Mittelstufenprüfung or Goethe-Zertificate C1).

b) German students:

- (1) Three year bachelor at a German University of Technology,
- (2) Knowledge of Chinese and English language of a level determined by THU.

By enrolling in the DDMPME a personal study plan will be written and approved by both parties.

#### **§ I.6. Certification of Studies Length and Requirements**

- (1) The planned duration of the DDMPME is to be 2 years. To earn the master's degree one shall complete at least 120 credits according to § II.1. At least 60 credits should be earned at the home university, and at least 60 credits at the partner university.
- (2) The graduate shall take a master degree exam. The precise details are outlined in the examination regulations.

#### **§ I.7. Module Catalogue**

- (1) During the studies program the modules of the categories listed in § II.1 are to be fulfilled and a definite number of credit points according to European Credit Transfer System (ECTS) (§ I.8.) shall be achieved.

(2) One module contains, as a rule, several lectures/classes of different types and ends in an exam. The same lecture/class can not be credited in more than one module.

(3) Those responsible for a particular module provide a description of this module in which the following aspects are described:

- Contents and qualification
- Teaching forms
- Classroom arrangements
- Conditions of participation
- Use of the module
- Workload
- Credit points and grades
- Conditions for awarding credit points
- Frequency of lectures and duration of the module

(4) The assignment of particular modules to the module groups as well as the form of examination, and the credit points assessment system are stated in the module list determined by both universities (see attachment). The examination boards of both universities may decide on changes to particular regulations within the module list. They may allow in individual cases the assignment of other modules to the one module group, if no study goals are changed.

### **§ I.8. Credit Points**

(1) The period of time the students need to cover one study module is judged in credit points according to ECTS.

One credit point spread over one semester indicates the average working input of 30 working hours including participation in lectures/classes as well as private study, tests and examination preparation.

(2) In order to receive credit, students must fulfill the module classwork requirements as well as pass the final examination. Specific requirements are found in the module description.

### **§ I.9. Classroom Arrangements**

(1) The course content is divided as follows:

1. Traditional lecture (VL). Subject material is presented by professor/lecturer.
2. Practice (UE). Practice serves to reinforce the material presented during lectures through examination of practical examples.
3. Tutorial (TUT). Tutorials serve to reinforce material presented during lectures through completing tasks in small work groups. The number of participants is limited to 15 students if possible.
4. Lab (PR). Lab consists of experimental exercises completed in small groups, in which the students are to learn handling and the suitable use of devices and instruments.
5. Integrated lectures/classes (IV). Integrated lecture entails of classroom arrangements occurring simultaneously without firmly predefined structure.
6. Project (PJ). Projects entail the planning and implementation process being realized in cooperative forms, on an interdisciplinary basis.
7. Seminar (SE). The teachers and students report on specific topics, which they then discuss a scientific basis.

8. Colloquium (CO). Colloquium prioritizes discussion between students and professors.

(2) The course catalogue which is issued once a semester gives information on the content of all lectures.

## **II. Structure of Studies**

### **§ II.1. Structure of Studies**

(1) At the TUB and THU different credit systems are used: 1 credit point at the THU is equivalent to 2 credits points at the TUB (European Credit Transfer System credits, ECTS credits). In the following, all rules are expressed in terms of ECTS credits.

(2) The DDMPME shall consist of the following categories:

- At least 18 credits advanced mathematical courses.
- At least 54 credits in two strong points, which have to be chosen from the list of six strong points listed below. From these 54 credits, at least 24 credits should be chosen from each of the strong points and at least 24 credits should be chosen from the "core area", defined in the module catalog (see attachment).
- At least 6 credits of the category "project".
- At least 24 elective credits (with at least 9 credits in technical subjects and at least 9 credits in non technical subjects).
- Master thesis (18 credits at TUB, regulation for THU see NOTICE below).

Advanced language courses may be chosen to fulfill 12 non-technical elective credits.

NOTICE. The following exception from the described structure can be accepted in the framework of a personal study plan approved by both universities: If the Master thesis is carried out at the THU, it is allowed to combine the 6 ECTS credits from category "project", 24 ECTS credits from the category "elective courses" and 18 ECTS credits from the category "Master thesis" to a single one year study and research work, which in this case will be counted with 48 ECTS credits.

(3) The list of the strong points:

- numerics and simulation
- fluid dynamics
- mechatronics
- solid state mechanics
- thermodynamics
- technical acoustics

(4) Courses assigned to particular categories or strong points are listed in module catalog.

(5) Courses may be chosen from predetermined categories to fulfill a given credit total for each category. In the event that more courses are available in a category than required to fulfill the total, students may choose which courses are taken to fulfill the total.

(6) The master thesis shall be carried out according to the regulations of the university, where the thesis is written. Each student is to have two supervisors, one from each university. The master thesis may be written in German, Chinese or English. The partner university is to

receive an extended abstract of the thesis of about 4 pages in the language of the partner university.

### **III. Final Clauses**

#### **§ III.1. Commencement**

The above study regulations are effective on the date the agreement on DDMPME is signed.