



ECTS – Information Package

This information package provides information on the Department of Mechanical Engineering at the Universität Karlsruhe (TH), its institutes and teaching activities.

Every effort has been made to ensure the accuracy of the information at the time of issue.

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1. DEPARTMENT OF MECHANICAL ENGINEERING

An important part of the Polytechnic school, established in 1825, the Department of Mechanical Engineering is one of the leading departments in the Universität Karlsruhe.

Prominent scientists and graduates have taught and/or studied in the Department of Mechanical Engineering: Ferdinand Redtenbacher and Wilhelm Nusselt established mechanical engineering as a scientific specialization in the middle of the nineteenth century. Carl Benz, the pioneer of the automobile, was a student in Karlsruhe from 1860 through 1864. Franz Grashof, one of the famous teachers and scientists, founded the German Association of Engineers (Verein Deutscher Ingenieure = VDI).

Scientific mechanical engineering at Karlsruhe encompasses the full spectrum of applications. Research at the Department of Mechanical Engineering is carried out in 20 institutes under strict scientific supervision including 28 full professors and about 260 scientific and 200 administrative/technical staff members.

Approximately 2100 students were enrolled in the year 2005; instruction is given by full-time professors, scientific staff members and about 25 lecturers from the industry.

Today, the education of mechanical engineers is based on a reform of the curriculum in the mid-sixties emphasizing the scientific framework and methods more than technological aspects. In 1998, a further refinement was introduced to ensure the outstanding profile of Karlsruhe university's education in mechanical engineering. The Department of Mechanical Engineering consists of the following 20 institutes, with varying numbers of specialized subdivisions in each institute.

- Institute of Applied Computer Science/Automation Technology (AIA)
- Institute of Ceramics in Mechanical Engineering (IKM)
- Institute of Conveying Technology and Logistics (IFL)
- Institute of Fluid Machinery (FSM)
- Institute of Fluid Mechanics (ISL)
- Institute of Human and Industrial Engineering (IFAB)
- Institute of Information Management in Engineering (IMI)
- Institute of Materials Science and Engineering I (IWK I)
- Institute of Materials Science and Engineering II (IWK II)
- Institute of Measurement and Automatic Control (MRT)

- Institute of Microstructure Technology (IMT)
- Institute of Nuclear Technology and Reactor Safety (IKR)
- Institute of Product Development (IPEK)
- Institute of Production Science (WBK)
- Institute of Reciprocating Engines (IFKM)
- Institute of Reliability of Mechanical Parts and Systems (IZBS)
- Institute of Technical Mechanics (ITM)
- Institute of Technical Thermodynamics (ITT)
- Institute of Thermal Turbomachinery (ITS)
- Institute of Vehicle Science and Mobile Machines (IFFMA)

Central coordination and administration of the Department:

- Dekan (Dean): Prof. Dr.-Ing. Martin Gabi
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- Pro-Dekan (Vice-Dean) Prof. Dr.-Ing. Marcus Geimer
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Examination Committees:

- Vorprüfungskommission (before "Vordiplom")
- Chairman: Prof. Dr.-Ing. J. Ovtcharova Phone: +49 721/608-2129
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2. PROGRAMS

Following programs of study are offered:

- Bachelor program (210 credits, 7 semesters)
- Diplom/Master program I (required for a doctoral degree; 300 credits, 10 semesters)
- Diplom/Master program II for students holding a Bachelor's degree (required for a doctoral degree; about 90 credits, 3 to 4 semesters)
- Post graduate study for university graduates with a degree in an appropriate field.

Based on completed basic studies ("Diplom-Vorprüfung" resp. "Vordiplom") in Mechanical Engineering or Electrical Engineering, an advanced interfacultative study program in "Mechatronics" has been established in winter 2000/2001.

3. INFORMATION ON BASIC STUDIES UP TO THE "DIPLOM-VORPRÜFUNG"

For both the Bachelor program and the Diplom/Master program I, all basic courses leading to the "Diplom-Vorprüfung", resp. "Vordiplom", are identical and should be completed within four semesters (120 credits). The following topics are obligatory.

Of the eleven examinations, that have to be passed, all are written except for the oral examination in "Materials Science".

Study before Vordiplom 1 st and 2 nd year of study all Students	WS ¹ 1. Sem. L E CPs ²			SS 2. Sem. L E CPs			WS 3. Sem. L E CPs			SS 4. Sem. L E CPs		
	Advanced Mathematics	4	2	7	4	2	7	4	2	7	-	-
Engineering Mechanics I, II, III,1 and III,2	3	2	6	2	2	5	2	2	5	2	2	5
Materials Science I,II	4	-	5	3	-	4	-	-	-	-	-	-
Laboratory Course in Materials' Science ³	-	-	-	-	3	3	-	-	-	-	-	-
Selected Topics in Experimental Physics	4	1	5	-	-	-	-	-	-	-	-	-
Physics Laboratory Course	-	-	-	-	2	2	-	-	-	-	-	-
Fundamentals of Chemistry	3	-	4	-	-	-	-	-	-	-	-	-
Mechanical Design I,II,III	-	-	-	2	2	5	4	4	9	2	2	5
Technical Thermodynamics I, II	-	-	-	-	-	-	3	2	5	2	2	5
Electrical Engineering and Electronics	-	-	-	-	-	-	4	-	4	2	-	3
Laboratory Course in Electr. Eng. and Electronics	-	-	-	-	-	-	-	-	-	-	2	2
Computer Science for Engineers	-	-	-	-	-	-	-	-	-	2	4	6
Foreign Language Course or Non-technical Course II	(2)	-	(2)	2	-	2	(2)	-	(2)	(2)	-	(2)
Non-technical Course I	(2)	-	(2)	(2)	-	(2)	(2)	-	(2)	2	-	2
Non-technical Course II	(2)	-	(2)	2	-	2	(2)	-	(2)	(2)	-	(2)

4. INFORMATION ON ADVANCED STUDIES AFTER THE “DIPLOM-VORPRÜFUNG”

In any specialization, there are a number of obligatory core courses, a group of two laboratory courses, additional specified elective courses, an advanced internship and thesis work.

The core courses of the Bachelor program are

- Measurement and control engineering
- Fluid mechanics
- Advanced machine design
- Industrial management

An individual specialization is made possible by the choice of the laboratory courses , one elective course and one major subject.

The final Bachelor's thesis (about 500 hours of work, i.e., three to four months) is recommended to be performed as a project in cooperation with the industry. The program is rounded off by an industrial internship of ten weeks.

The complete structure is shown in the following table.

¹ WS = Wintersemester, SS = Sommersemester

² Credit points according to ECTS (L=lecture, E=exercise)

³ The laboratory course is offered as a two-week compact course in the period between Sommersemester and Wintersemester.

Study after Vordiplom 5 th to 7 th Semester Bachelor's Degree	WS		SS		CPs
	5. Sem.		6. Sem.		
	L	E	L	E	
Fluid Mechanics	2	2	-	-	7
Introduction to Measurement and Control Engineering	3	1	-	-	7
Advanced Machine Design A	-	-	3	-	6
Industrial Management	2	2	-	-	6
Metrological Laboratory	-	-	-	2	3
Specialized Lab Course *)	-	-	-	3	4
Internship in the Industry. (in 5 th and 6 th Semester)					12
Elective Course	2	-	(2)	-	4
Main Subject	-	-	6	-	11
Bachelor's Thesis (in 7 th Semester)					30

*) Both metrological laboratory and specialized lab course may be substituted by Production laboratory I course.

There are seven examinations including the Bachelor's thesis. All core course examinations are written, elective course and major subject are completed by oral examinations.

The obligatory core courses of the Diplom/Master program I in all areas of specialization are

- Measurement and control engineering
- Fluid mechanics
- Advanced machine design A and
- Mathematical methods in mechanical engineering

Depending on the area of specialization there are two further compulsory core courses and a course each in advanced physics, advanced mechanics, computer science and economics. Furthermore an "integrated course" covering both theoretical and applied aspects of a specific topic is obligatory.

The eight areas of specialization are the following:

- General mechanical engineering
- Materials' science and technology
- Energy and environmental engineering

- Vehicle Engineering
- Mechatronics and microsystems engineering
- Product development and design
- Production engineering
- Theoretical mechanical engineering

In each area, two elective courses and two major subjects have to be taken by the students, two specific laboratory courses, a project (approximately 500 hours of work), 20 weeks of internship in the industry and the final „Diplom“ thesis (four months).

The complete structure is shown as an example for the specialization General Mechanical Engineering in the following table:

Study after Vordiplom 3 rd to 5 th year of study “Diplom” Degree, Specialization: General Mech. Eng.	WS 5. Sem.		SS 6. Sem.		WS 7. Sem.		SS 8. Sem.		CPs
	L	E	L	E	L	E	L	E	
Fluid Mechanics	2	2	-	-	-	-	-	-	7
Introduction to Measurement and Control Engineering	3	1	-	-	-	-	-	-	7
Math.Methods in Mech. Engineering.	2	1	(2)	(1)	-	-	-	-	6
Advanced Machine Design A and B	-	-	7	2	-	-	-	-	14
Heat and Mass Transfer	2	2	-	-	-	-	-	-	7
Industrial Management	-	-	-	-	2	2	(2)	(2)	6
Metrological Laboratory	-	-	-	2	-	-	-	-	3
Specialized Lab Course	-	-	-	--	-	3	(-)	3	4
Technical Computer Science	-	-	-	-	2	1	(2)	(1)	4
Advanced Mechanics	-	-	-	-	2	-	(2)	-	3
Physics for Engineers	-	-	-	-	(2)	(1)	2	1	4
Integrated Course	-	-	2	2	(2)	(2)	-	-	6
Project work (7 th or 8 th Semester)									26
Specialized Internship in the Industry (in 7 th to 9 th Semester)									23
2 Elective Courses	-	-	2	-	2	-	-	-	8
2 Major Subjects	-	-	-	-	-	-	12	-	22
Diplom Thesis (in 9 th Semester)									30

There are 12 examinations including the project work and the Diplom thesis. The six core courses are finished by written examinations, all elective courses and the major subjects are assessed by oral examinations.

Holders of a Bachelor's degree can earn the German "Diplom-Ingenieur" degree with another three to four semesters of study in the Diplom/Master program II.

Required for admission is a special examination or proof of equivalence to the Bachelor's degree at the Universität Karlsruhe (TH). Two compulsory core courses (depending on the area of specialization), one "integrated course", up to two laboratory courses and up to two elective courses, up to 26 weeks of internship in the industry and additional courses in advanced mechanics, advanced physics and computer science (depending on completed prerequisites and transfers), two major subjects and the "Diplom" thesis are required for graduation.

5. STUDYING MECHANICAL ENGINEERING AS AN ERASMUS STUDENT

ERASMUS students usually spend a semester or two abroad to become acquainted with another university within the framework of the SOCRATES mobility program sponsored by the European Community. Their main interest is to supplement or complement their home university program by specific modules (mainly from the advanced courses in the Diplom/Master program I) of the Universität Karlsruhe - or to work on a project or on a final thesis.

An ERASMUS-student in mechanical engineering at Universität Karlsruhe (TH) is admitted and registered by the International Office (Akademisches Auslandsamt) and the Admission Office (Studienbüro).

After that, the student is asked to report as soon as possible to the ECTS secretary, Mrs. Kantz in the Dean's office (building no. 10.91, 1st floor, Monday to Friday, 10:00 – 12:00 a.m.) to fill in an ERASMUS-student form, which the student should carry on her or him for the whole period of study in the Department of Mechanical Engineering.

To apply for all examinations, the student must pick up the examination form in the ECTS office and then hand it to the examiner. At the end of the stay, she or he will receive a certificate from the ECTS secretary containing all your examination results including ECTS grades that should be taken back to the home university in order to transfer the credits.

If you require any further information on the course program, please refer to the course catalogue with commentaries of the Mechanical Engineering Department where the content (in German and in English) of all courses including aims and scopes, examination mode, prerequisites, literature, ECTS credits, etc. is described.

The internet location is

<http://www.rz.uni-karlsruhe.de/~hf65/KVV/>

In addition, the directory of lectures („Vorlesungsverzeichnis“) sold at bookstores in Karlsruhe lists the complete course offerings for the current semester including location, time and starting dates of the courses.

The internet location is (follow link "Vorlesungsverzeichnis")

<http://www.uni-karlsruhe.de/studierende/>

We wish you a pleasant and successful stay at the Department of Mechanical Engineering of the Universität Karlsruhe (TH)!