

General Course Regulations
for a Bachelor of Science (B.Sc.) in
COMPUTER ENGINEERING
COMPUTER SCIENCE AND COMMUNICATIONS ENGINEERING
CONTROL AND INFORMATION SYSTEMS
ELECTRICAL AND ELECTRONIC ENGINEERING
MATERIAL TECHNOLOGY
MECHANICAL ENGINEERING
and a Master of Science (M.Sc.) in
COMPUTER ENGINEERING
COMPUTER SCIENCE AND COMMUNICATIONS ENGINEERING
CONTROL AND INFORMATION SYSTEMS
ELECTRICAL AND ELECTRONIC ENGINEERING
MECHANICAL ENGINEERING
COMPUTATIONAL MECHANICS
within the Scope of internationally oriented academic programme
INTERNATIONAL STUDIES IN ENGINEERING (ISE)
at the University of Duisburg-Essen
on 20 February 2004

Official Bulletin 2, 2004 p. 19

modified by Article I of the Regulations of 16. January 2008 (VBI, p. 61) **)

Pursuant to § 2, para. 4, and § 86, para. 1, of the Law for Universities (*Hochschulgesetz*, hereafter LU) in North Rhine-Westfalia of 14 March 2000 (GV. NRW, p. 190), last modified by the Act of 28 January 2003 (GV. NRW 2003, p. 36), the Faculty of Engineering Sciences at the University of Duisburg-Essen hereby issues the following 'Course Regulations':

Table of Contents:

§ 1 Purpose of the 'Course Regulations'	§ 10 Curricula
§ 2 General Goals of the Programmes	§ 11 B.Sc. Subjects
§ 3 Subjects	§ 12 M.Sc. Subjects
§ 4 Student Counselling	§ 13 Internships
§ 5 Admission to the Programmes	§ 14 Experience Abroad
§ 6 Beginning of Studies	§ 15 Continuous Assessment Examinations
§ 7 Standard Period of Study and Scope of Programmes	§ 16 Projects
§ 8 Types of Courses (<i>Veranstaltungen</i>)	§ 17 B.Sc. Thesis
§ 9 General Structure of the Programmes	§ 18 M.Sc. Thesis
	§ 19 Conclusion of the Programmes
	§ 20 Purview
	§ 21 Effective Date and Publication

ATTENTION: Only the rules and regulations in their German form are legally binding.

Annexe 1: Key to Annexes 2 and 3

B.Sc. Programme:

- Annexe 2.1: Curriculum (*Studienplan*) for the Common First Year
- Annexe 2.2.1: Curriculum for the Second and Third Years in 'Computer Engineering'
- Annexe 2.2.2: Curriculum for the Second and Third Years in 'Computer Science and Communications Engineering'
- Annexe 2.2.3: Curriculum for the Second and Third Years in 'Control and Information Systems'
- Annexe 2.2.5: Curriculum for the Second and Third Years in 'Mechanical Engineering'
- Annexe 2.2.6: Curriculum for the Second and Third Years in 'Material Technology'

M.Sc. Programme:

- Annexe 3.1: Curriculum for 'Computer Engineering'
- Annexe 3.2: Curriculum for 'Computer Science and Communications Engineering'
- Annexe 3.3: Curriculum for 'Control and Information Systems'
- Annexe 3.4.1: Curriculum for 'Electrical and Electronic Engineering' with a Major in 'Communications Engineering'
- Annexe 3.4.2: Curriculum for 'Electrical and Electronic Engineering' with a Major in 'Power and Automation'
- Annexe 3.5.1: Curriculum for 'Mechanical Engineering' with a Major in 'Mechatronics'
- Annexe 3.5.2: Curriculum for 'Mechanical Engineering' with a Major in 'Production and Logistics'
- Annexe 3.5.3: Curriculum for 'Mechanical Engineering' with a Major in 'Water Resources and Environmental Engineering'
- Annexe 3.5.4: Curriculum for 'Mechanical Engineering' with a Major in 'General Mechanical Engineering'
- Annexe 3.6: Curriculum for 'Computational Mechanics'

Guidelines:

- Annexe 4: Guidelines to the Transitional Regulations from the B.Sc. to the M.Sc. Programmes in ISE
- Annexe 5: Guidelines to an External B.Sc.

§ 1

Purpose of the Course Regulations

(1) Subject to the 'Examination Regulations' (*Prüfungsordnung*) for the consecutively designed Bachelor of Science (B.Sc.) and Master of Science (M.Sc.) in the internationally oriented programme 'International Studies in Engineering' (ISE) of 1 August 2003 (published in the *Ämlichen Mitteilungen der Universität Duisburg-Essen* 1/18, 4 August 2003: 'Gazette'), the following Course Regula-

tions govern the study of all B.Sc. and M.Sc. subjects within ISE at the University of Duisburg-Essen.

(2) The 'Course Regulations' describe the admission requirements and the objectives and procedures of the B.Sc. and M.Sc. programmes. They also contain commentary on, and concrete application of, the rules of the 'Examination Regulations' and are designed to enable students to rigorously plan and shape their programme so that on the one hand the standard period of study can be adhered to and on the other hand—maintaining the basic principle of academic freedom—a reasonable portion of their studies can be pursued according to their special interests. The 'Course Regulations' thus provide a guide to the effective and responsible planning of the programme.

§ 2

General Goals of the Programmes

(1) The bachelor's and master's programmes, which are designed to facilitate a student's smooth progress through their various stages, convey the empirical knowledge and skills that enable a student to practice an engineering profession. The bachelor's programme leads to the first academic degree, which permits its holders to enter the profession or to proceed to the master's level of study. In acquiring a master's degree a candidate is able to practice the engineering profession in the field of research and development and to progress to the doctoral level. By means of an interdisciplinary design to the programme and the inclusion of a large number of non-technical subjects, the training will, in addition, help candidates meet the demands of a dynamic marketplace, the globalisation of business and society, and the changes in our way of life. Courses taught in English, as well as an obligatory period spent abroad in an English-speaking country (or in an institution in which English is the *lingua franca*), lend the programme an international flavour that increases the professional perspectives of all students and facilitates, in addition, the participation of foreign students.

(2) The bachelor's and master's programmes are designed to create engineers whose theoretical, methodological and practical knowledge and skills enable them to perform scientific work, critically assess scientific knowledge and responsibly employ their learning.

(3) An important educational goal of the bachelor's programme is to convey basic knowledge in the various engineering science disciplines comprising an interdisciplinary approach. In the first year students acquire a sound grasp of basic theoretical and applied knowledge that provides the foundation of any engineering science degree. In the second and third years students gain the requisite knowledge and practical skills in the field of engineering that will enable them to work successfully in an interdisciplinary team. The bachelor's thesis demonstrates that students are able within a prescribed period of time to independently treat a typical problem within their field in a satisfactory scientific manner. Upon a student's completion of a bachelor's degree, the Faculty of Engineering Sciences (5) at the University of Duisburg-Essen shall

award him or her the degree of Bachelor of Science (B.Sc.).

(4) In all subjects in the M.Sc. programme the goals are to expand the knowledge and hone the skills that students' acquire in a bachelor's programme and to guide them towards independent scientific work. The B.Sc.-acquired abilities will be developed, expanded and supplemented so as to increase their professional perspectives in the marketplace and to expand their potential within the academy. The master's thesis demonstrates a student's ability to present within a prescribed period of time and by employing the appropriate methodological procedures satisfactory results of independent research on a scientific problem. Upon a student's successful completion of the master's degree, the Faculty of Engineering Sciences (5) in the University of Duisburg-Essen shall award him or her the degree of Master of Science (M.Sc.).

(5) In addition to the course offerings in both the B.Sc. and M.Sc. programmes students are urged to avail themselves of the courses offered in other departments of the University that will help satisfy the expected demands of their professional careers. In order to recognise and evaluate social, historical, economic and ecological relationships, a programme of 'general education' is highly recommended.

§ 3

Subjects

(1) On the basis of the 'Examination Regulations' students can specialise in the following areas in fulfilment of the B.Sc.:

- a) Computer Engineering,
- b) Computer Science and Communications Engineering,
- c) Control and Information Systems,
- d) Electrical and Electronic Engineering,
- e) Mechanical Engineering,
- f) Material Technology.

(2) Likewise students can specialise in the following areas in fulfilment of the M.Sc.:

- a) Computer Engineering,
- b) Computer Science and Communications Engineering,
- c) Control and Information Systems,
- d) Electrical and Electronic Engineering with a Major in
 - Communications Engineering,
 - Power and Automation;
- e) Mechanical Engineering with a Major in
 - Mechatronics,
 - Production and Logistics,
 - Water Resources and Environmental Engineering,
 - General Mechanical Engineering;
- f) Computational Mechanics.

§ 4

Student Counselling

(1) Preparatory and continuous student counselling supports students in planning their programmes of study, choosing additional or elective modules and changing subjects or institutions of higher learning.

(2) Student counselling is undertaken by the Central Student Counselling Service of the University of Duisburg-Essen. It includes matters of eligibility for academic programmes, information on course offerings, and programme contents, organisation and requirements. It also embraces personal difficulties related to a student's programme as well as psychological counselling as defined by § 83, para. 1, sentence 2, of the LU.

(3) Continuous course counselling and academic counselling as authorised by the Faculty Council and as mandated by the cooperating disciplines of Engineering Sciences are undertaken and conducted by professors and members of the academic staff. These members of the Faculty advise students in planning their courses, organising their programmes, choosing electives and, where necessary, determining a major in the M.Sc. programme. In addition, all professors in the ISE faculty play a significant role in student counselling.

(4) Especially in matters relating to examinations the Dean of Students, in addition to the members of the Examination Committee, can participate in the counselling of students.

(5) Students are obliged at the beginning of their studies to familiarise themselves with the 'Examination Regulations' and the 'Course Regulations'.

§ 5

Admission to the Programmes

(1) Admission to a **B.Sc. programme** is governed by the provisions on equivalency of preparatory training as described in Regulations Governing University Qualification (*Qualifikationsverordnung*) in agreement with the LU in North Rhine-Westfalia.

(2) Besides the general admissions prerequisites as stated in the 'Examination Regulations' a special aptitude and ability as well as sufficient knowledge of German and English as defined in §66, para. 5, of the LU must be demonstrated for a B.Sc. and M.Sc. subject. The 'Examination Regulations' deal with specific cases.

(3) Pursuant to § 66, para. 6, of the LU, the qualifications needed for a degree programme in ISE introduced in (1) can be waived if the prospective student provides evidence (such as an aptitude test or some other proof of aptitude) of a specific programme-related qualification and a general education conforming to the demands of the University of Duisburg-Essen.

(4) The establishing of both an academic aptitude for one of the subjects and a general educational requirement equivalent to that required by the University of Duisburg-Essen takes place during the evaluation of the application

for admission to the programme by the Examination Committee. Here copies of the certification of school and university training in the subjects taken and the grades achieved as well as documentation of additional extracurricular activities, qualifications and achievements, including a CV, must be presented.

(5) No special deadlines for the compliance with (4) are mandated nor is a special form for the ordinary application for admission necessary.

(6) In order to establish an academic aptitude for an engineering subject, the main emphasis in the completed subjects and examinations will be evaluated. Students admitted to the programme must in their previous education have concentrated on mathematics, natural sciences, computer sciences, engineering sciences or other fields of technology and have received high grades in these subjects. A clear major in these areas is established when at least 50% of a student's chosen courses in the country in which he or she was educated can be ascertained. Students have received 'high grades' if they placed in the top twenty-fifth percentile of their class.

(7) Proof of general education that meets the standards of the University of Duisburg-Essen can be established by the presentation of relevant documentation of previous education as described in (4) above.

(8) Moreover, the admission to a degree programme requires candidates to document a completed Industrial Internship as described in §13 of these 'Course Regulations'.

(9) Admission to an **M.Sc. programme** can only be granted to those who have previously completed a related or comparable B.Sc. and received the required grades in completing their degree. The 'Examination Regulations' (see § 4 therein) provide more specific information on this point.

(10) With decreasing relevance of the preceding B.Sc. subject to any given M.Sc. subject, the Examination Committee can establish additional courses or other credits as requirements that must be fulfilled at the latest at the registration for the beginning of the M.Sc. thesis. The expected amount of the credits to be made up when progressing from the B.Sc. to the M.Sc. programmes can be estimated from Annexe 4 to these Regulations; in any event progression from one degree to the next within ISE will not create a deficit of more than a maximum of thirty credits. Annexe 4 serves as a guideline for students and merely indicates the normally expected transitional possibilities and requirements; the Annexe cannot be used in particular cases as the basis for legal action to obtain recognition of credits or admission to the programme.

(11) Other subjects, that is, those completed outside of ISE that are normally comparable as described in §. 5/para. (6) and thus qualify as a subject for the M.Sc. can be inferred from Annexe 5 of these 'Course Regulations'. Annexe 5 serves as guidelines for students and merely indicates what credits normally will be recognised; no legal claims for recognition of credits or admission to the programme can be asserted in individual cases on the

basis of the Annexe. Moreover, para. (6) is valid where it applies.

(12) The recognition of the length of study time, the number of credits, and the examinations passed is clearly laid out in the 'Examination Regulations'.

§ 6

Beginning of Studies

(1) Students can begin a bachelor's programme only in the winter semester.

(2) Students can begin a master's programme in the winter semester and, with the exception of 'Computational Mechanics', in the summer semester.

(3) Matriculation (*Einschreibung*) as a prerequisite for the regular admission to a programme is governed by the Matriculation Regulations of the University of Duisburg-Essen in its current version. Information on this point is provided by the Student Office (*Studierendensekretariat*) of the University.

§ 7

Standard Period of Study and Scope of Programmes

(1) The standard period of study in the **bachelor's programme**, including a six-week industrial internship, a mandatory period abroad, three months devoted to the bachelor's thesis and, in some cases, a four-week period for a project, is three years; the project can, under certain circumstances, be replaced by other courses concluded by a continuous assessment examination (see § 17 of the 'Examination Regulations'; § 15 of these 'Regulations' below). More specific information can be found in the 'Examination Regulations'.

(2) Course offerings in a specialisation in the bachelor's programme (see § 2 above) are spread over three years. A programme comprises, depending on the courses in any special area, between 121 and 124 hours (SWS). (The term 'Semesterwochenstunden' (SWS) designates the sum of the hours a course meets every week in a semester; 4 SWS means that a course meets four hours per week for the duration of a semester.) The precise distribution of courses can be seen in § 10 below (compare also Annexe 2 to these 'Course Regulations').

(3) The standard period of study in the **master's programme**, including a minimum three-week industrial internship and a six-month period spent on the thesis, is two years. More specific information can be found in the 'Examination Regulations' (see § 6 therein).

(4) Course offerings in a specialisation in the master's programme (see § 2 above) are spread over one and a half years. A programme comprises, depending on the courses in any special area, between 61 and 65 hours (SWS). The precise distribution of courses can be seen in § 10 below (compare also Annexe 3 to these 'Course Regulations').

(5) Students attend courses an average of approximately twenty hours per week every semester. In addition, the time spent in preparation and review of materials covered in each course, individual study and the preparation for and the taking of examinations must also be calculated. The Curricula are designed to require students to average approximately forty hours per week on their studies.

§ 8

Types of Courses

(1) In both the bachelor's and the master's programmes the following types of courses (teaching and learning formats) are offered:

1. Lectures,
2. Exercises,
3. Laboratories,
4. Excursions,
5. Projects,
6. Industrial Internships.

(2) Lectures comprise a formal oral discourse on interrelated basic and specialised material and methods of analysis before a live audience.

(3) Exercises are opportunities to apply and practice scientific methods and procedures as well as to acquire basic knowledge in face-to-face learning situations. Language exercises, for example, involve instruction in the grammatical principles of language and the oral and written practice in mastering them.

(4) In a laboratory students apply basic knowledge in a largely independent fashion to typical problems in any given discipline. The substance of courses will thus be delved into, the relations and methods further studied, and practical skills acquired. Prior to commencement of the first activities in each laboratory students must prove to the Faculty of Engineering Sciences that they are familiar with the prevailing laboratory regulations.

(5) Excursions supplement course work. They demonstrate the connection between the academy and the working world. They take place in the form of visits to facilities outside the University and are designed to convey insights into ordinary problems of the working world that bear an intimate connection to matter covered in an academic setting. Excursions occur on an optional basis in relation to courses or exercises and are not individually listed in the curriculum.

(6) A project is designed both to increase theoretical knowledge by applying it to concrete problems and to practice teamwork.

(7) Industrial Internships are designed to provide students with the chance to gain experiences early that they can use in their professions later. In addition, an internship completed in the advanced stages of the programme provides students with the chance to apply scientific knowledge in their subsequent professional field and to evaluate the relevant interdependence between academic knowledge and professional experience. Last but not

least, internships allow students the opportunity to ascertain the suitability of their choice of subject and profession.

§ 9

General Structure of the Programmes

(1) All subjects on the **B.Sc. level** include

1. a common first year comprising
 - basic modules in engineering science, mathematics and natural science, and
 - an interdisciplinary module comprising engineering science laboratories;
2. in the second and third years a technical module, depending on the subject, comprising
 - subject modules that establish a focus in the individual B.Sc. subjects,
 - additional basic modules offering the fundamentals of mathematics, natural science and engineering science, and
 - supplementary modules offering material from neighbouring or auxiliary disciplines;
3. a technical elective in the sixth semester that consists either of the work on the project or of material in two technical electives,
4. two non-technical electives that span all three years,
5. a six-week industrial internship, and
6. the bachelor's thesis.

(2) All subjects on the **M.Sc. level** include

1. technical subject modules that comprise core expertise in each of the chosen subjects or majors,
2. a module for advanced students in mathematics, natural sciences or engineering sciences,
3. a technical elective module,
4. a non-technical elective module,
5. a three-week industrial internship, and
6. the master's thesis.

(3) The B.Sc. and M.Sc. programmes are modular. Modules are blocks of thematically organised teaching units that comprise a part of the qualifications for a degree. Each module normally consist of 6 to 18 credits and span two to three semesters.

(4) Each course is assigned European Credit Transfer System (ECTS)-credits that reflect the time students spend completing them. Per semester thirty credits must be earned, which are awarded only for courses that are concluded with continuous assessment examinations. More specific information can be found in the 'Examination Regulations' (e.g., § 11 therein).

(5) For the completion of a B.Sc. programme 180 credits must be acquired. For the M.Sc. programme 120 credits are necessary. In the Annexes of these 'Regulations' the obligatory credits for courses attended and examinations passed are listed for all subjects, on the condition that a

choice of electives as described in § 10, paras. 2 and 3, is not possible.

(6) The quantitative and qualitative study and examination credits for all students in the programme will be maintained in a Credit-Point Account as described by the 'Examination Regulations' (see § 13 therein).

§ 10

Curricula

(1) Based upon these 'Course Regulations' and the 'Examination Regulations', a curriculum plan illustrates the exemplary progress by students who carefully plan their studies through the chosen subjects towards one of the two degrees.

(2) Annexes 2.1 to 2.2.6 to these 'Course Regulations' present in tabular form the regulations for subjects on the bachelor's level. In addition to the compulsory courses listed there and continuous assessment examinations (see § 15 below), students may also choose electives

- from the technical electives module,
- from the two non-technical elective modules, and
- from the compulsory technical-subject module as long as a module for a course or a continuous assessment examination permits two alternatives.

(3) Annexes 3.1 to 3.6 to these 'Course Regulations' list the regulations for subjects on the master's level. In addition to the compulsory courses listed there and continuous assessment examinations (see § 15 below) students may also choose electives

- from the technical electives module for all the courses offered in the master's programme,
- from the two non-technical elective modules, and
- from the compulsory technical subject-module as long as a module for a course or a continuous assessment examination permits two alternatives.

(4) Under certain conditions students of both the bachelor's and the master's programmes can change a subject in any electives module, but the record of the number of attempts to pass any examination in the previous module will carry over to the new subject. More specific information can be found in the 'Examination Regulations' (see § 24 therein).

(5) Continuous assessment examinations (§ 15 below) as defined in the Annexes will be normally held in the language in which the course tested is taught. Exceptions must be approved by the Examination Committee.

(6) The proper planning of studies is strictly the responsibility of the student. The curricula are thus to be understood as suggestions for achieving study goals within the prescribed period of time. However, it must also be emphasised that departures from the curricula can result in immediate delays that can also later restrict a student's eligibility to take part in other courses or modules. Appropriate

cautions are for this reason included in the accompanying curricula.

§ 11

B.Sc. Subjects

(1) The common first year for all students in the bachelor programme consists of the basics of engineering science (mathematics, natural sciences, informatics, elementary electrical engineering, mechanics and design theory). These courses are intended to provide a foundation for the specialised knowledge that comprises the advanced level in the various subjects.

(2) All of the subjects offered on the bachelor's level provide a balanced combination of general fields in engineering science and specialised courses depending on specific subjects. They constitute the basis for both communication and cooperation on a professional level between engineers of different disciplines and for completing studies that lead to the next level.

(3) The major in 'Computer Engineering' is closely tied to the specialised material from the fields of digital circuit design, computer architecture, software engineering and network engineering and network technology.

(4) The interdisciplinary major in 'Computer Science and Communications Engineering' is closely tied to the disciplines of electrical engineering, informatics and information engineering.

(5) The interdisciplinary major in 'Control and Information Systems' is closely tied to the disciplines of informatics and automation.

(6) The major in 'Electrical and Electronic Engineering' is closely tied to the disciplines of electrical engineering technology, communications technology (including mobile radio technology) and electronic engineering/microelectronic engineering.

(7) The major in 'Mechanical Engineering' is closely tied to the disciplines of mechanics, thermo dynamics, fluid mechanics, and material technology.

(8) The major in 'Material Technology' is closely tied to the emphasis on the basics in natural science (metallurgy, physical and inorganic chemistry, mechanics), heat engineering and thermal transfer, metallurgy, conversion technology and materials science.

§ 12

M.Sc. Subjects

(1) All of the subjects on the master's level cover in addition to an intensification of selected fundamental subjects in engineering sciences additional scientific expertise in a student's desired professional field as well as the qualification for the doctorate.

(2) 'Computer Engineering' covers a wide range of topics in the fields of computer architecture, software technologies, multimedia and computer networks.

(3) The interdisciplinary subject 'Computer Science and Communications Engineering' focuses on topics in the fields of computer sciences and communications technology.

(4) The interdisciplinary subject 'Control and Information Systems' focuses on topics in the area of computer sciences and automation technology/engineering.

(5) 'Electrical and Electronic Engineering' focuses on topics from a cross section of two elective majors as well as on technical majors in electrical engineering/ automation technology or communications technology. In a major in 'Communications Engineering' modern systems of digital communication networks provide a major focus of attention. The major in 'Power and Automation' focuses on energy transfer technology and the modelling of systems.

(6) 'Mechanical Engineering' focuses on a cross section of all the majors as well as all major modules. In a major in 'Mechatronics' mathematical modelling of dynamic systems and mechatronic application occupy the main areas of research. A major in 'Production and Logistics' focuses on logistics, product engineering and production engineering. A major in 'Water Resources and Environmental Engineering' concentrates on power engineering, water technology and environmental management.

(7) The interdisciplinary subject 'Computational Mechanics' covers topics in structural mechanics, numerical mathematics and the applied fields of finite element technologies.

§ 13

Industrial Internships

(1) All B.Sc. students must prove that they have completed a fourteen-week industrial internship as defined more precisely in the 'Examination Regulations' (see § 7, paras. (1) to (3) therein).

(2) All M.Sc. students must prove that they have completed a six-week industrial internship as defined more precisely in the 'Examination Regulations' (see § 7, paras. (4) to (5) therein).

(3) The Faculty of Engineering Sciences at the University of Duisburg-Essen (5) advises and supports the students in their choice of an appropriate industrial internship completed during their studies. During their internship students remain members of the University and will be supervised by the appropriate facilities of the institution.

(4) A previously completed internship relevant for the chosen subject in ISE or the documentation of an equivalent activity can, following a detailed written application, be accepted by the Examination Committee as an industrial internship.

(5) The completion of an industrial internship related to a student's study and professional goals longer than the period specified in paras. (1) and (2) is strongly recommended.

(6) The 'General Industrial Internship Regulations' of the Faculty of Engineering Sciences for the subjects in ISE of the University of Duisburg-Essen provide more specific information on this point.

§ 14

Experience Abroad

(1) On the authority of the 'Examination Regulations' students of each B.Sc. subject who have earned their university qualifications in a German-speaking facility must spend time abroad. Students who are registered for an M.Sc. subject and have previously completed a different subject for a B.Sc or a one at another institute of higher learning must spend time abroad if they are unable to document a period that the Examination Committee recognises as equivalent.

(2) The Examination Committee regulates the length and the purpose of the period abroad.

(3) The experience abroad should be normally spent in an English-speaking country or in a facility in which English is the *lingua franca*. If the period is being used for course credits or for completing a B.Sc. or M.Sc. thesis, a general cooperative agreement on the recognition of credits should be concluded between the Faculty of Engineering Sciences of the University of Duisburg-Essen and each host institution and recorded with the Examination Committee before the beginning of the sojourn. If such is not the case, then credits as well as the period abroad will be recognised only if the student concerned receives written confirmation in advance of the acceptability of both.

(4) The Faculty of Engineering Sciences in the University of Duisburg-Essen advises and supports the students in their choice of an appropriate stay abroad as defined in para. (1). During their stay abroad students remain members of the University of Duisburg-Essen.

(5) A lengthier stay abroad than that referred to in the 'Examination Regulations' with respect to a student's study and professional goals is strongly recommended.

§ 15

Continuous Assessment Examinations

(1) On the continuous assessment examinations (i.e., final examinations; see further § 17 of the 'Examination Regulations') concluding each taught course in the B.Sc. and M.Sc. programmes, the students must demonstrate their ability, in the amount of time provided and using the allowed auxiliary aids and the established methodology of engineering science, to comprehend, analyse and solve a variety of problems and questions posed from the areas of their studies.

(2) The 'Examination Regulations' specify in which courses continuous assessment examinations must be taken, the application procedures for the examinations, their form and structure, and the resitting of failed examinations.

(3) With the exception of the bachelor's thesis (see. § 17 below) and the master's thesis (see. § 18 below) all examinations are assessed continuously, that is, immediately following each course in a module. The subject of each examination is the contents of the respective courses: i.e., lectures, exercises, and so on. More specific information is provided in the 'Examination Regulations' (see § 17 therein).

(4) The Examination Committee is responsible for the organisation of the examinations and the compliances with the rules and regulations of the 'Examination Regulations'.

§ 16

Projects

(1) A project as defined in the 'Examination Regulations' (see § 33 therein) is a type of examination supplementing class work during the bachelor programme and comprised of a task engaged in by a group of students to provide practical experience, to apply and intensify knowledge and skills and to practice and exploit the division of independent labour.

(2) In this context the project represents the independent solution to a task or problem by a group usually consisting of more than two students. The 'Examination Regulations' contain criteria as to the choice of topic and the supervision of the project.

(3) A project must be sited in a technical module of the respective subject for which the student is enrolled. The project should be initiated only after the knowledge and abilities gained during the programme, normally between the third and the fifth semesters, permit the treatment of the chosen subject on the level defined in the 'Examination Regulations'. The registration of the project is subject to the procedure defined in the 'Examination Regulations' (see § 33, para. (5) therein). The precise definition of the topic to be treated in the project must be formulated in writing by the project's advisor.

(4) The 'Examination Regulations' contain additional stipulations on project deadlines, formal design and scope, and grading procedures.

§ 17

Bachelor's Thesis

(1) The bachelor's thesis is an examination paper that concludes the scientific training in the bachelor's programme.

(2) The thesis represents an independent solution to a typical task or problem within the field in the context of a theoretical or applied background. The 'Examination Regulations' contain information on the choice of the topic and the thesis advisor (see § 35 therein).

(3) The bachelor's thesis can be commenced only when a sufficient number of continuous assessment examinations has been passed and the industrial internship as defined

in § 13, para. 1 (above), has been completed and the resulting total of 126 credits have been accumulated. Moreover, the proof of the language requirements as defined in the 'Examination Regulations' (see § 5 therein) must also have been submitted. The procedure for commencing work on the bachelor's thesis, in which the prerequisites for work on the thesis are checked and the thesis topic as well as its deadline are established, is covered in detail in the 'Examination Regulations' (see § 35, paras. (2) to (5) therein). Prior to registration the precise formulation of the thesis topic is to be formulated in writing by the advisor.

(4) The period spent in preparing the thesis is normally three months. The 'Examination Regulations' contain additional stipulations on thesis deadlines, formal design and scope, and grading procedures (see § 35).

§ 18

Master's Thesis

(1) The master's thesis is an examination paper that concludes the scientific training in the master's programme.

(2) The thesis represents an independent solution to a scientific task or problem of a theoretical or applied nature. The 'Examination Regulations' contain information on the choice of the topic and the thesis advisor (see § 43 therein).

(3) The thesis can be commenced only when a sufficient number of continuous assessment examinations has been passed and the industrial internship as defined in § 13, para. 2, has been completed and the resulting total of 63 credits has been accumulated. Moreover, the proof of the language requirements as defined in the 'Examination Regulations' (see § 5 therein) must also have been submitted. The procedure for permission to commence work, in which the conditions for permission are checked and the thesis topic as well as its deadline are established, on a master's thesis is covered in detail in the 'Examination Regulations' (see § 43, paras. (2) to (5) therein). Prior to registration the precise formulation of the thesis topic is to be formulated in writing by the advisor.

(4) The period spent in preparing the thesis is normally six months. The 'Examination Regulations' contain additional stipulations on thesis deadlines, formal design and scope, and grading procedures (see § 43 therein).

§ 19

Completion of the Programmes

(1) A bachelor's programme has been completed when all of the examinations have been passed, the bachelor's thesis as defined by the rules in the 'Examination Regulations' has been accepted and 180 credits have been accumulated.

(2) A master's programme has been completed when all of the examinations have been passed, the master's thesis as defined by the rules in the 'Examination Regula-

tions' has been accepted and 120 credits have been accumulated.

§ 20

Purview

(1) These 'Course Regulations' apply to all students who register for the first time in the winter semester of 2002/2003 or later at the University of Duisburg-Essen for a B.Sc. or an M.Sc. subject in ISE as listed in § 3 above.

(2) Moreover, the additional conditions of the 'Examination Regulations' apply to the purview and the Transitional Provisions correspondingly.

§ 21

Effective Date and Publication

These 'Course Regulations' come into force on 1 October 2002. They shall be announced in the *Official Bulletin of the University of Duisburg-Essen*.

Drawn up pursuant to the resolution of the Faculty Council of the Faculty of Engineering Sciences (5) of the University of Duisburg-Essen on 15 October 2003.

Duisburg and Essen, 20 February 2004

The Rector
of the University of Duisburg-Essen
Prof. Dr. Lothar Zechlin

Regulation altered by:

*) Regulation Change of 11 May 2005 (VBI S. 179),
went into effect on 01 October 2004

**) Regulation Change of 16 January 2008 (VBI S. 61),
went into effect on the day following publication

Annexe 1:
Key to Annexes 2 und 3

- Sem.= Semester der Veranstaltung (Semester of the Course)
- P= Pflichtlehrveranstaltung (Required Course)
- WP= Wahlpflichtlehrveranstaltung (Elective Course)
- V= Vorlesung (Lecture)
- Ü= Übung (Exercise)
- P= Praktikum Spr. = Sprache der Veranstaltung (Language of the Course)
- D= Deutsch (German)
- E= Englisch (English)
- SWS= Semesterwochenstunden (Contact Hours per Week of any Course)
- Cr.= Anrechnungspunkte (Credits)

Note: When not specified, the language of instruction will depend upon the given course or, in the case of a project or B.Sc. or M.Sc. thesis, upon the appropriate stipulations in the 'Examination Regulations'.

B.Sc. Programme

Annexe 2.1:

Curriculum (*Studienplan*) for the Common First Year in ISE

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Natural Sciences / Naturwissenschaften	1	Mathematics 1 (P)	Mathematik 1 (P)	4	2	0	7
	2	Mathematics 2 (P)	Mathematik 2 (P)	3	2	0	6
	1	General Chemistry (P)	Allgemeine Chemie (P)	2	1	0	4
	2	Physics (P)	Physik (P)	2	1	1	5
Mechanical Engineering / Maschinenbau	1	Mechanics 1 (P)	Mechanik 1 (P)	2	1	0	4
	2	Mechanics 2 (P)	Mechanik 2 (P)	2	1	0	4
	2	Design Theory 1 (P)	Konstruktionslehre 1 (P)	1	1	0	3
Electrical Engineering / Elektrotechnik	1	Fundamentals of Electrical Engineering 1 (P)	Grundlagen der Elektrotechnik 1 (P)	2	1	0	4
	2	Fundamentals of Electrical Engineering 2 (P)	Grundlagen der Elektrotechnik 2 (P)	2	1	0	4
Computer Engineering / Computer Engineering	1	Fundamentals of Computer Engineering 1 (P)	Grundlagen Computer Engineering 1 (P)	2	1	0	4
	2	Fundamentals of Program- ming 1 (Programming in C) (P)	Grundlagen der Programmierung 1 (Programmieren in C) (P)	2	1	0	4
Fundamental Labs / Grundlagen Labore	1	Introduction to CAx (P)	Einführung in CAx (P)	0	0	2	3
	1	Interdisciplinary Labs (P)	Interdisziplinäres Labor (P)	0	0	2	2
	2	Computer Based Problem Solving (P)	Computergestützte Problemlösung (P)	0	0	2	2
Non-Technical Subjects 1 / Nicht technische Fächer 1	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	2	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
Summe				28	13	7	60
				48 SWS			Cr.

Annexe 2.2.1:

**Curriculum for the Second and Third Years in
'Computer Engineering'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Computer Science Mathematics / Informatik Mathematik	3	Mathematics C1 (Discrete Mathematics) (P)	Mathematik C1 (Diskrete Mathematik) (P)	2	2	0	6
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieurmathematik (P)	1	1	1	4
Fundamentals of Informatics / Grundlagen der Informatik	3	Modelling Methods in Informatics (P)	Modellierungsmethoden der Informatik (P)	3	1	0	6
	3	Programming Paradigms (P)	Programmierparadigmen (P)	2	1	0	4
	4	Human Computer Interaction (P)	Mensch-Computer-Interaktion (P)	4	0	0	5
Electronic Components / Elektronische Komponenten	3	Signals and Systems 1 (P)	Signale und Systeme 1 (P)	3	2	0	6
	5	Basic Electronic Devices (P)	Elektronische Bauelemente (P)	2	1	1	5
	5	Components of Digital Systems (P)	Bauelemente und Grundsaltungen (P)	2	1	0	4
Multimedia and Internet / Multimedia und Internet	5	Internet Technology (P)	Internet-Technologie	2	1	0	4
	5	Designing Multimedia Applications (WP) OR Data Models and Databases (WP)	Entwurf von Multimedia-Applikationen (WP) ODER Datenmodelle und Datenbanken (WP)	2	0	2	5
Fundamentals of Software Engineering 1 / Grundlagen der Programmwurfstechnik 1	3	Fundamentals of Programming 2 (OO Programming in C++) (P)	Grundlagen der Programmierung 2 (OO-Programmieren in C++) (P)	2	1	0	4
	4	Fundamentals of Software Engineering 1 (Structured Analysis) (P)	Grundlagen der Programmwurfstechnik 1 (Strukturierte Analyse) (P)	2	0	2	5
Fundamentals of Software Engineering 2 / Grundlagen der Programmwurfstechnik 2	4	Algorithms and Data-Structures (P)	Algorithmen und Datenstrukturen (P)	2	1	0	4
	5	Fundamentals of Software Engineering 2 (P)	Grundlagen der Programmwurfstechnik 2 (P)	2	0	1	4
Computer Systems and Networks / Computer-Systeme und Netzwerke	4	Logical Design of Digital Systems (P)	Logischer Entwurf digitaler Systeme (P)	2	1	1	5
	5	Microcomputer Systems (P)	Mikrocomputer-Systeme (P)	2	1	2	6
	6	Computer Networks Lab (P)	Computer-Netzwerke-Labor (P)	0	1	2	4
	6	Operating Systems and Computer Networks (P)	Betriebssysteme und Computer-Netzwerke (P)	2	1	0	4
Non-Technical Subjects 2 / Nicht technische Fächer 2	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	3	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	4	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	4	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	6	Project (WP) OR 2 Electives (WP)	Projekt (WP) ODER 2 Wahlpflichtfächer (WP)	0	6	0	6
Summe				45	22	12	99 Cr.
				79 SWS			

V e r k ü n d u n g s b l a t t

of the University of Duisburg-Essen – Official Bulletin

Prov. Official Bulletin

October 2004

Page 13

Annexe 2.2.2:

Curriculum for the Second and Third Years in 'Computer Science and Communications Engineering'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Computer Science Mathematics / Informatik Mathematik	3	Mathematics C1 (Discrete Mathematics) (P)	Mathematik C1 (Diskrete Mathematik) (P)	2	2	0	6
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieurmathematik (P)	1	1	1	4
Fundamentals and Auxiliary Engineering Disciplines / Grundlagen und Hilfswissenschaften	3	Programming Paradigms (P)	Programmierparadigmen (P)	2	1	0	4
	4	Signals and Systems 2 (P)	Signale und Systeme 2 (P)	2	2	0	5
	5	Basic Electronic Devices (P)	Elektronische Bauelemente (P)	2	1	1	5
Multimedia and Internet / Multimedia und Internet	5	Internet Technology (P)	Internet-Technologie (P)	2	1	0	4
	5	Designing Multimedia Applications (WP) OR Data Models and Databases (WP)	Entwurf von Multimedia-Applikationen (WP) ODER Datenmodelle und Datenbanken (WP)	2	0	2	5
Signals / Signale	3	Signals and Systems 1 (P)	Signale und Systeme 1 (P)	3	2	0	6
	4	Digital Filters (P)	Digitale Filter (P)	2	1	0	3
	5	Radio Propagation Channels (P)	Wellenausbreitung und Funkkanäle (P)	2	1	0	4
Communications and Microwave Engineering / Nachrichten- und Mikro- wellentechnik	4	Microwave and RF-Technology (P)	Hochfrequenztechnik (P)	2	1	1	5
	5	Analog Filters (P)	Analoge Filter (P)	2	1	0	3
	6	Mobile Communications (WP) OR Transmission and Modulation (WP)	Mobilkommunikationstechnik (WP) ODER Signalübertragung und Modulation (WP)	2	1	0	3
Computer Systems and Networks / Computer-Systeme und Netzwerke	4	Logical Design of Digital Systems (P)	Logischer Entwurf digitaler Systeme (P)	2	1	1	5
	5	Microcomputer Systems (P)	Mikrocomputer-Systeme (P)	2	1	2	6
	6	Computer Networks Lab (P)	Computer-Netzwerke-Labor (P)	0	1	2	4
	6	Operating Systems and Computer Networks (P)	Betriebssysteme und Computer-Netzwerke (P)	2	1	0	4
Fundamentals of Software Engineering 1 / Grundlagen der Programmierungstechnik 1	3	Fundamentals of Programming 2 (OO Programming in C++) (P)	Grundlagen der Programmierung 2 (OO-Programmieren in C++) (P)	2	1	0	4
	4	Fundamentals of Software Engineering 1 (Structured Analysis) (P)	Grundlagen der Programmierungstechnik 1 (Strukturierte Analyse) (P)	2	0	2	5
Non-Technical Subjects 2 / Nicht technische Fächer 2	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	3	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	4	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	6	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	3	Project (WP) OR 2 Electives (WP)	Projekt (WP) ODER 2 Wahlpflichtfächer (WP)	0	6	0	6
Summe				44	26	12	99
				82 SWS			Cr.

Annexe 2.2.3:

**Curriculum for the Second and Third Years in
'Control and Information Systems'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Supplements to Fundamentals of Mathematics / Erweiterung zu Grundlagen der Mathematik	3	Mathematics 3 (P)	Mathematik 3 (P)	2	2	0	5
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieurmathematik (P)	1	1	1	4
Supplements to Fundamentals of Electrical Engineering / Erweiterung zu Grundlagen der Elektrotechnik	3	Fundamentals of Electrical Engineering 3 (P)	Grundlagen der Elektrotechnik 3 (P)	2	1	0	4
	3	Electrical Engineering Lab (P)	Elektrotechnik Labor (P)	0	0	3	4
Thermodynamics / Thermodynamik	3	Thermodynamics 1 (P)	Thermodynamik 1 (P)	2	1	0	4
	4	Thermodynamics 2 (P)	Thermodynamik 2 (P)	2	2	0	5
Technological Fundamentals / Technologische Grundlagen	4	Materials Engineering (P)	Materialtechnik (P)	2	0	0	3
	5	Basic Electronic Devices (P)	Elektronische Bauelemente (P)	2	1	1	5
Fundamentals of Automation and Control / Grundlagen der Automatisierungs- und Regelungstechnik	4	Introduction to Automation (P)	Einführung in die Automatisierungstechnik (P)	2	1	1	5
	5	Systems and Control 1 (P)	Systemtheorie und Regelungstechnik 1 (P)	2	1	0	4
	6	Systems and Control 2 (P)	Systemtheorie und Regelungstechnik 2 (P)	2	1	1	5
Fundamentals of Software Engineering 1 / Grundlagen der Programmwurfstechnik 1	3	Fundamentals of Programming 2 (OO Programming in C++) (P)	Grundlagen der Programmierung 2 (OO-Programmieren in C++) (P)	2	1	0	4
	4	Fundamentals of Software Engineering 1 (Structured Analysis) (P)	Grundlagen der Programmwurfstechnik 1 (Strukturierte Analyse) (P)	2	0	2	5
Fundamentals of Extended Software Engineering / Grundlagen der erweiterten Programmwurfstechnik	5	Internet Technology (P)	Internet-Technologie (P)	2	1	0	4
	5	Introduction to Measurement Technology (P)	Einführung in die Messtechnik (P)	2	1	0	4
Control Engineering, Modelling and Simulation / Engineering der Prozessautomatisierung, Modellbildung und Simulation	5	Process Control Engineering (P)	Prozessautomatisierung (P)	2	1	0	4
	5	Process Control Engineering Lab (P)	Prozessautomatisierung Labor (P)	0	0	1	1
	5	Modelling and Simulation of Dynamic Systems (P)	Modellbildung und Simulation dynamischer Systeme (P)	2	1	1	5
Computer Systems and Networks / Computer-Systeme und Netzwerke	3	Microcomputer Systems (P)	Mikrocomputer-Systeme (P)	2	1	2	6
	4	Operating Systems and Computer Networks (P)	Betriebssysteme und Computer-Netzwerke (P)	2	1	0	4
Non-Technical Subjects 2 / Nicht technische Fächer 2	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	4	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	5	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	6	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	6	Project (WP) OR 2 Electives (WP)	Projekt (WP) ODER 2 Wahlpflichtfächer (WP)	0	6	0	6
Summe				43	24	13	99
				80 SWS			Cr.

Annexe 2.2.4:

**Curriculum for the Second and Third Years in
'Electrical and Electronic Engineering'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Supplements to Fundamentals of Mathematics / Erweiterung zu Grundlagen der Mathematik	3	Mathematics 3 (P)	Mathematik 3 (P)	2	2	0	5
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieurmathematik (P)	1	1	1	4
Supplements to Fundamentals of Electrical Engineering / Erweiterung zu Grundlagen der Elektrotechnik	3	Fundamentals of Electrical Engineering 3 (P)	Grundlagen der Elektrotechnik 3 (P)	2	1	0	4
	3	Electrical Engineering Lab (P)	Elektrotechnik Labor (P)	0	0	3	4
Fields and Materials / Feldtheorie und Materialtechnik	3	Introduction to Materials of Electrical Engineering (P)	Einführung in die Werkstoffe der Elektrotechnik (P)	2	1	0	4
	4	Introduction to Materials of Electrical Engineering Lab (P)	Einführung in die Werkstoffe der Elektrotechnik Labor (P)	0	0	1	1
	5	Electromagnetic Field Theory 1 (P)	Theoretische Elektrotechnik 1 (P)	2	1	0	4
Control Engineering / Regelungstechnik	4	Introduction to Automation (P)	Einführung in die Automatisierungstechnik (P)	2	1	1	5
	5	Systems and Control 1 (P)	Systemtheorie und Regelungstechnik 1 (P)	2	1	0	4
Electronics / Technische Elektronik	4	Introduction to Solid State Electronics (P)	Einführung in die Festkörperelektronik (P)	2	2	0	5
	5	Optoelectronics (WP) OR Microelectronics (WP)	Optoelektronik (WP) ODER Mikroelektronik (WP)	2	1	0	3
	5	Basic Electronic Devices (P)	Elektronische Bauelemente (P)	2	1	1	5
Communications Engineering / Nachrichtentechnik	6	Microwave and RF-Technology (P)	Hochfrequenztechnik (P)	2	1	1	5
	5	Communications 1 (P)	Nachrichtentechnische Systeme 1 (P)	2	1	1	5
	6	Mobile Communications (WP) OR Transmission and Modulation (WP)	Mobilkommunikationstechnik (WP) ODER Signalübertragung und Modulation (WP)	2	1	0	3
Auxiliary Engineering Disciplines / Hilfswissenschaften	3	Microcomputer Systems (P)	Mikrocomputer-Systeme (P)	2	1	0	4
	3	Fundamentals of Programming 2 (OO Programming in C++) (P)	Grundlagen der Programmierung 2 (OO-Programmieren in C++) (P)	2	1	0	4
Electrical Power Engineering / Elektrische Energietechnik	3	Fundamentals of Electrical Energy Technology (P)	Grundlagen der elektrischen Energietechnik (P)	2	1	1	5
	4	Electrical Power Systems (P)	Elektrische Energieversorgung (P)	2	0	1	4
	5	High-Voltage Engineering (P)	Hochspannungstechnik (P)	2	0	1	4
	6	Electromagnetic Compatibility (P)	Elektromagnetische Verträglichkeit (P)	2	1	0	3
Non-Technical Subjects 2 / Nicht technische Fächer 2	4	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	4	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	5	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	6	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	4	Project (WP) OR 2 Electives (WP)	Projekt (WP) ODER 2 Wahlpflichtfächer (WP)	0	6	0	6
Summe				45	25	12	99
				82 SWS			Cr.

V e r k ü n d u n g s b l a t t

of the University of Duisburg-Essen – Official Bulletin

Prov. Official Bulletin

October 2004

Page 16

Annexe 2.2.5:

Curriculum for the Second and Third Years in 'Mechanical Engineering'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Engineering Fundamentals / Ingenieur-Grundlagen	3	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	3	Statistics for Engineers (P)	Statistik für Ingenieure (P)	1	1	0	3
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieur- mathematik (P)	1	1	1	4
	3	Mechanics 3 (P)	Mechanik 3 (P)	2	2	1	6
Thermodynamics / Thermodynamik	3	Thermodynamics 1 (P)	Thermodynamik 1 (P)	2	1	0	4
	4	Thermodynamics 2 (P)	Thermodynamik 2 (P)	2	2	0	5
Machine Technology / Maschinentechnik	4	Fluid Mechanics (P)	Strömungsmechanik (P)	2	1	0	3
	5	Fluid Machines (WP) OR Machine Tools (WP)	Strömungsmaschinen (WP) ODER Werkzeugmaschinen (WP)	2	0	1	4
Materials and Manufactur- ing / Werkstoffe und Ferti- gung	3	Materials Science 1 (P)	Werkstoffkunde 1 (P)	4	0	1	5
	4	Materials Science 2 (P)	Werkstoffkunde 2 (P)	2	0	1	4
	4	Manufacturing (P)	Fertigungslehre (P)	2	1	0	4
Engineering Design / Konstruktionstechnik	3	Design Theory 2 (P)	Konstruktionslehre 2 (P)	2	2	0	5
	4	Design Theory 3 (P)	Konstruktionslehre 3 (P)	2	2	0	5
	5	CAD / CAE (P)	CAD / CAE (P)	2	0	1	3
Engineering I / Engineering I	5	Modelling and Simulation (WP) OR Computational Fluid Dynamics (WP)	Modellbildung und Simulation (WP) ODER Numerische Fluidodynamik (WP)	2	1	0	3
	5	Control Technique (P)	Regelungstechnik (P)	3	2	0	6
	6	Energy Engineering (WP) OR Mechatronics (WP)	Energietechnik (WP) ODER Mechatronik (WP)	2	1	0	3
Engineering II / Engineering II	5	Production Management (P)	Produktionsmanagement (P)	2	1	0	4
	6	Product Engineering (WP) OR Process Engineering (WP)	Produktentwicklung (WP) ODER Verfahrenstechnik (WP)	2	1	0	4
	5	Material Flow and Logistics (WP) OR Waste Treatment (WP)	Materialfluss und Logistik (WP) ODER Abfallbehandlung (WP)	2	1	0	4
Non-Technical Subjects 2 / Nicht technische Fächer 2	4	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	4	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	5	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	5	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	6	Project (WP)	Projekt (WP)	0	6	0	6
Summe				49	28	6	99
				83 SWS			Cr.

V e r k ü n d u n g s b l a t t

of the University of Duisburg-Essen – Official Bulletin

Prov. Official Bulletin

October 2004

Page 17

Annexe 2.2.6:

Curriculum for the Second and Third Years in 'Material Technology'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Mathematical and Natural Science Fundamentals / Naturwissenschaftliche und mathematische Grundlagen	3	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	3	Statistics for Engineers (P)	Statistik für Ingenieure (P)	1	1	0	3
	4	Computer Based Engineering Mathematics (P)	Computergestützte Ingenieur- mathematik (P)	1	1	1	4
	3	Anorganic Chemistry (P)	Anorganische Chemie (P)	2	0	1	3
	4	Physical Chemistry (P)	Physikalische Chemie (P)	2	0	1	3
Engineering Fundamentals / Ingenieurwissenschaftliche Grundlagen	3	Thermodynamics 1 (P)	Thermodynamik 1 (P)	2	1	0	4
	3	Design Theory 2 (P)	Konstruktionslehre 2 (P)	2	2	0	5
	4	Design Theory 3 (P)	Konstruktionslehre 3 (P)	2	2	0	5
Applied Engineering Sci- ence / Angewandte Ingenieurwis- sensschaften	3	Materials Science 1 (P)	Werkstoffkunde 1 (P)	4	0	1	5
	4	Materials Science 2 (P)	Werkstoffkunde 2 (P)	2	0	1	4
	5	Heat Transfer (P)	Wärmeübertragung (P)	2	0	0	2
	6	Fundamentals of High Temperature Technology (P)	Grundlagen der Hochtempera- turtechnik (P)	1	1	0	3
Metallurgy / Metallerzeugung	4	Fundamentals of Metallurgy (P)	Grundlagen der Metallurgie (P)	1	1	1	4
	5	Iron Making (P)	Eisengewinnung (P)	2	1	0	4
	5	Steelmaking 1 (P)	Stahlerzeugung 1 (P)	2	1	0	4
	6	Steelmaking 2 (P)	Stahlerzeugung 2 (P)	1	1	1	4
	6	Non Ferrous Metallurgy (P)	NE-Metallerzeugung (P)	1	1	0	3
Metals and Metal Forming / Metalle und Metallumfor- mung	3	Metal Physics 1 (P)	Grundlagen der Metallkunde 1 (P)	2	0	0	2
	4	Metal Physics 2 (P)	Grundlagen der Metallkunde 2 (P)	2	0	1	4
	5	Theory of Plasticity (P)	Plastomechanik (P)	2	1	0	4
	5	Metal Forming 1 (P)	Umformtechnik 1 (P)	2	1	1	5
	6	Metal Forming 2 (P)	Umformtechnik 2 (P)	1	1	1	4
Non-Technical Subjects 2 / Nicht technische Fächer 2	4	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
	4	Non-Technical Subject 4 (WP)	Nicht technisches Fach 4 (WP)	2	0	0	2
	4	Non-Technical Subject 5 (WP)	Nicht technisches Fach 5 (WP)	2	0	0	2
	5	Non-Technical Subject 6 (WP)	Nicht technisches Fach 6 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	5	Project (WP) OR 2 Electives (WP)	Projekt (WP) ODER 2 Wahlpflichtfächer (WP)	0	6	0	6
		Summe			47	24	10
				81 SWS			Cr.

M.Sc. Programme

Annexe 3.1:

Curriculum for 'Computer Engineering'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Advanced mathematical and informatics Theories/ Fortgeschrittene mathematische und informationstechnische Theorien	1	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	2	Information Theory (P)	Informationstheorie (P)	2	2	0	5
	3	Embedded Systems (P)	Embedded Systems (P)	2	1	1	6
Advanced Computer Engineering / Fortgeschrittene Computertechnik	1	Computer Architecture (P)	Computer-Architektur (P)	2	1	0	5
	2	Advanced Computer Architecture (P)	Fortgeschrittene Computer-Architektur (P)	2	1	0	5
Advanced Software and Multimedia Engineering / Fortgeschrittene Software- und Multimediatechnik	1	Multimedia (P)	Multimedia (P)	2	2	0	5
	2	Computervision (P)	Computervision (P)	2	2	0	5
Advanced Network Technology / Weiterführende Netzwerk-Technologie	1	Security, Safety and Reliability of Digital Systems (P)	Sicherheit und Zuverlässigkeit digitaler Systeme (P)	2	1	0	5
	2	Switched Networks (P)	Switched Networks (P)	2	2	0	6
	2	Security in Computer Networks (P)	Sicherheit in Computernetzen (P)	2	1	0	4
Advanced Software Technology / Weiterführende Software-Technologie	2	Software Technology (P)	Software-Technologie (P)	2	1	0	5
	3	Distributed Systems (P)	Verteilte Systeme (P)	2	1	1	6
	3	CSCW and Software Engineering (P)	CSCW und Programmwurf-technik (P)	2	0	2	6
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	1	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				38	20	4	87
				62 SWS			Cr.

V e r k ü n d u n g s b l a t t

of the University of Duisburg-Essen – Official Bulletin

Prov. Official Bulletin

October 2004

Page 19

Annexe 3.2:

Curriculum for 'Computer Science and Communications Engineering'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Advanced mathematical and communication Theories / Fortgeschrittene mathematische und nachrichtentechnische Theorien	1	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	2	Communications 2 (P)	Nachrichtentechnische Systeme 2 (P)	2	2	0	5
	2	Information Theory (P)	Informationstheorie (P)	2	2	0	5
Advanced Computer Engineering / Fortgeschrittene Computertechnik	1	Computer Architecture (P)	Computer-Architektur (P)	2	1	0	5
	2	Advanced Computer Architecture (P)	Fortgeschrittene Computer-Architektur (P)	2	1	0	5
Advanced Communications Engineering / Fortgeschrittene Nachrichtentechnik	1	Communication Networks (P)	Kommunikationsnetze (P)	2	1	0	5
	3	Communications 3 (P)	Nachrichtentechnische Systeme 3 (P)	2	1	0	4
	3	Advanced Mobile Communications (P)	Moderne Mobilkommunikation (P)	2	1	0	4
	3	Distributed Systems (P)	Verteilte Systeme (P)	2	1	1	6
Coding / Kodierung	2	Coding Theory (P)	Kodierungstheorie (P)	2	1	0	4
	3	Multidimensional Signals (P)	Mehrdimensionale Signale (P)	2	1	0	5
Advanced Network Technology / Weiterführende Netzwerk-Technologie	1	Security, Safety and Reliability of Digital Systems (P)	Sicherheit und Zuverlässigkeit digitaler Systeme (P)	2	1	0	5
	2	Security in Computer Networks (P)	Sicherheit in Computernetzen (P)	2	1	0	4
	2	Switched Networks (P)	Switched Networks (P)	2	2	0	6
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	1	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				40	21	1	87 Cr.
				62 SWS			

Annexe 3.3:

Curriculum for 'Control and Information Systems'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Mathematics, Numerics and Physics / Mathematik, Numerik und Physik	1	Mathematics 4 (P)	Mathematik 4 (P)	2	2	0	5
	1	Fluid Dynamics (P)	Fluiddynamik (P)	2	1	0	5
	2	Informatics and Numerical Methods 1 (P)	Informatik und numerische Methoden 1 (P)	2	1	0	5
	3	Informatics and Numerical Methods 2 (P)	Informatik und numerische Methoden 2 (P)	2	1	0	5
Advanced Systems and Control Theory / Fortgeschrittene System- und Regelungstheorie	1	Nonlinear Control Systems (P)	Nichtlineare Regelungssysteme (P)	2	2	1	7
	2	Stochastic Estimation and Control (P)	Stochastische Verfahren der Regelungstechnik (P)	2	1	0	4
	2	Advanced Systems and Control Theory (P)	Höhere System- und Regelungstheorie (P)	2	1	0	4
	3	Robust Control (P)	Robuste Regelung (P)	2	1	0	4
Advanced Control Technology and Applications / Fortgeschrittene Technologien und Anwendungen der Automatisierungstechnik	2	Human Machine Systems (P)	Mensch-Maschine-Systeme (P)	3	0	0	4
	2	Advanced Control Lab (P)	Regelungstechnisches Aufbau- praktikum (P)	0	0	3	5
	3	Fault Diagnosis and Tolerance in Technical Systems (P)	Fehlerdiagnose und -toleranz in technischen Systemen (P)	2	1	0	5
Advanced Computer Systems Technology / Fortgeschrittene Computersystem-Technologie	1	Security, Safety and Reliability of Digital Systems (P)	Sicherheit und Zuverlässigkeit digitaler Systeme (P)	2	1	0	5
	2	Software Technology (P)	Software-Technologie (P)	2	1	0	5
	3	Distributed Systems (P)	Verteilte Systeme (P)	2	1	1	6
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	1	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	2	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				39	17	5	87
				61 SWS			Cr.

V e r k ü n d u n g s b l a t t

of the University of Duisburg-Essen – Official Bulletin

Prov. Official Bulletin

October 2004

Page 21

Annexe 3.4.1:

Curriculum for 'Electrical and Electronic Engineering' with a Major in 'Communications Engineering'

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Advanced mathematical and electrical Theories / Fortgeschrittene mathematische und elektrotechnische Theorien	1	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	1	Mathematics 4 (P)	Mathematik 4 (P)	2	2	0	5
	2	Electromagnetic Field Theory 2 (P)	Theoretische Elektrotechnik 2 (P)	2	2	0	6
Cross Section Module / Querschnittsmodul	1	Computer Architecture (P)	Computer-Architektur (P)	2	1	0	5
	2	Basic Electronic Circuits (P)	Grundlagen elektronischer Schaltungen (P)	2	1	1	5
	2	Communications 2 (P)	Nachrichtentechnische Systeme 2 (P)	2	2	0	5
	2	Systems and Control 2 (P)	Systemtheorie und Regelungstechnik 2 (P)	2	1	1	5
Fundamentals / Grundlagen	3	Microwave Theory and Techniques (WP) OR Multidimensional Signals (WP)	Mikrowellentechnik (WP) ODER Mehrdimensionale Signale (WP)	2	1	1 oder 0	5
	2	Coding Theory (P)	Kodierungstheorie (P)	2	1	0	4
	3	Communications 3 (P)	Nachrichtentechnische Systeme 3 (P)	2	1	0	4
Applications / Anwendungen	1	Communication Networks (P)	Kommunikationsnetze (P)	2	1	0	5
	2	Mobile Communication Equipment (P)	Mobilkommunikationsgeräte (P)	2	1	0	4
	3	Distributed Systems (P)	Verteilte Systeme (P)	2	1	1	6
	3	Optical Communications Technology (WP) OR Ultrawideband Communications (WP)	Optische Kommunikationstechnik (WP) ODER Ultrabreitband-Übertragungssysteme (WP)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	3	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	3	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	1	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				40	21	3 oder 4	87 Cr.
				64 oder 65 SWS			

Annexe 3.4.2:

**Curriculum for 'Electrical and Electronic Engineering' with a Major in
'Power and Automation'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Advanced mathematical and electrical Theories / Fortgeschrittene mathe- matische und elektrotech- nische Theorien	1	Mathematics C2 (Numerical Mathematics) (P)	Mathematik C2 (Numerische Mathematik) (P)	2	2	0	6
	1	Mathematics 4 (P)	Mathematik 4 (P)	2	2	0	5
	2	Electromagnetic Field Theory 2 (P)	Theoretische Elektrotechnik 2 (P)	2	2	0	6
Cross Section Module / Querschnittsmodul	1	Computer Architecture (P)	Computer-Architektur (P)	2	1	0	5
	2	Basic Electronic Circuits (P)	Grundlagen elektronischer Schaltungen (P)	2	1	1	5
	2	Communications 2 (P)	Nachrichtentechnische Systeme 2 (P)	2	2	0	5
	2	Systems and Control 2 (P)	Systemtheorie und Regelungstechnik 2 (P)	2	1	1	5
Automation / Automatisierung	1	Modelling and Simulation of Dynamic Systems (P)	Modellbildung und Simulation dynamischer Systeme (P)	2	1	1	5
	3	Power System Operation and Control (P)	Dynamik und Regelung elek- trischer Netze (P)	2	1	1	6
	3	Nonlinear Control Systems (P)	Nichtlineare Regelungssysteme (P)	2	2	1	7
Power / Energie	1	Power System Analysis (P)	Berechnung elektrischer Netze (P)	2	1	0	5
	2	Power Electronics and Drives (P)	Leistungselektronik und Antriebe (P)	2	1	0	5
	2	Devices for Power Transmission (P)	Betriebsmittel für den elek- trischen Energietransport (P)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	1	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	3	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				38	21	5	87
				64 SWS			Cr.

Annexe 3.5.1:

**Curriculum for 'Mechanical Engineering' with a Major in
'Mechatronics'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Production Technology / Produktionstechnik	1	Machine Lab (P)	Maschinenlabor (P)	0	0	3	5
	2	Production Technology (P)	Produktionstechnik (P)	2	1	0	5
Fluidflow and Combustion / Strömung und Verbrennung	1	Fluid Dynamics (P)	Fluiddynamik (P)	2	1	0	5
	1	Combustion Science (P)	Verbrennungslehre (P)	2	1	0	5
Advanced Engineering / Weiterführende In- genieurwissenschaften	2	Computational Methods (P)	Computergestützte Berechnungsmethoden (P)	0	0	4	6
	2	Control Theory (P)	Regelungstheorie (P)	3	1	1	7
	3	Project Management (P)	Projektmanagement (P)	2	1	0	4
System Dynamics / Systemdynamik	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Mathematical Methods / Mathematische Methoden	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Mechatronics Applications / Mechatronische An- wendungen	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Selected Topics / Wahlpflichtfächer	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	3	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				39	16	8	87
				63 SWS			Cr.

Annexe 3.5.2:

**Curriculum for the M.Sc. Subject 'Mechanical Engineering' with a Major in
'Production and Logistics'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Production Technology / Produktionstechnik	1	Machine Lab (P)	Maschinenlabor (P)	0	0	3	5
	2	Production Technology (P)	Produktionstechnik (P)	2	1	0	5
Fluidflow and Combustion / Strömung und Verbrennung	1	Fluid Dynamics (P)	Fluiddynamik (P)	2	1	0	5
	1	Combustion Science (P)	Verbrennungslehre (P)	2	1	0	5
Advanced Engineering / Weiterführende In- genieurwissenschaften	2	Computational Methods (P)	Computergestützte Berechnungsmethoden (P)	0	0	4	6
	2	Control Theory (P)	Regelungstheorie (P)	3	1	1	7
	3	Project Management (P)	Projektmanagement (P)	2	1	0	4
Logistics and Material Flow / Logistik und Materialfluss	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
Product Engineering / Produkt Engineering	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
Production Technology and Management / Produktionstechnik und Management	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
Selected Topics / Wahlpflichtfächer	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahl- pflichtkatalog (WP)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	3	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				39	16	8	87
				63 SWS			Cr.

Annexe 3.5.3:

**Curriculum for 'Mechanical Engineering' with a Major in
'Water Resources and Environmental Engineering'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Production Technology / Produktionstechnik	1	Machine Lab (P)	Maschinenlabor (P)	0	0	3	5
	2	Production Technology (P)	Produktionstechnik (P)	2	1	0	5
Fluidflow and Combustion / Strömung und Verbrennung	1	Fluid Dynamics (P)	Fluiddynamik (P)	2	1	0	5
	1	Combustion Science (P)	Verbrennungslehre (P)	2	1	0	5
Advanced Engineering / Weiterführende In- genieurwissenschaften	2	Computational Methods (P)	Computergestützte Berechnungsmethoden (P)	0	0	4	6
	2	Control Theory (P)	Regelungstheorie (P)	3	1	1	7
	3	Project Management (P)	Projektmanagement (P)	2	1	0	4
Energy Engineering / Energietechnik	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Water Resources Management / Management von Wasser- ressourcen	1	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Environmental Protection Management / Umweltschutzmanage- ment	2	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Selected Topics / Wahlpflichtfächer	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
	3	Subject to be selected from catalogue (WP)	Veranstaltung aus dem Wahlp- flichtkatalog (WP)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	3	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				39	16	8	87
				63 SWS			Cr.

Annexe 3.5.4:

**Curriculum for 'Mechanical Engineering' with a Major in
'General Mechanical Engineering'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Production Technology / Produktionstechnik	1	Machine Lab (P)	Maschinenlabor (P)	0	0	3	5
	2	Production Technology (P)	Produktionstechnik (P)	2	1	0	5
Fluidflow and Combustion / Strömung und Verbrennung	1	Fluid Dynamics (P)	Fluiddynamik (P)	2	1	0	5
	1	Combustion Science (P)	Verbrennungslehre (P)	2	1	0	5
Advanced Engineering / Weiterführende Ingenieurwissenschaften	2	Computational Methods (P)	Computergestützte Berechnungsmethoden (P)	0	0	4	6
	2	Control Theory (P)	Regelungstheorie (P)	3	1	1	7
	3	Project Management (P)	Projektmanagement (P)	2	1	0	4
Fundamentals and Methods / Grundlagen und Methoden	2	Advanced Dynamics (WP)	Höhere Dynamik (WP)	2	1	0	4
	2	Heat- and Mass-Transfer (WP)	Wärme- und Stoffübertragung (WP)	2	1	0	4
Production and Materials/ Produktion und Werkstoffe	1	Subject to be selected from Catalogue PM1 (WP)	Veranstaltung aus dem Katalog PM1 (WP)	2	1	0	4
	3	Subject to be selected from Catalogue PM2 (WP)	Veranstaltung aus dem Katalog PM2 (WP)	2	1	0	4
Energy and Process Engineering/ Energie und Verfahrenstechnik	1	Subject to be selected from Catalogue EPE1 (WP)	Veranstaltung aus dem Katalog EPE1 (WP)	2	1	0	4
	3	Subject to be selected from Catalogue EPE2 (WP)	Veranstaltung aus dem Katalog EPE2 (WP)	2	1	0	4
Mechatronics / Mechatronik	2	Subject to be selected from Catalogue M1 (WP)	Veranstaltung aus dem Katalog M1 (WP)	2	1	0	4
	3	Subject to be selected from Catalogue M2 (WP)	Veranstaltung aus dem Katalog M2 (WP)	2	1	0	4
Non-Technical Subjects / Nicht technische Fächer	1	Non-Technical Subject 1 (WP)	Nicht technisches Fach 1 (WP)	2	0	0	2
	3	Non-Technical Subject 2 (WP)	Nicht technisches Fach 2 (WP)	2	0	0	2
	3	Non-Technical Subject 3 (WP)	Nicht technisches Fach 3 (WP)	2	0	0	2
Electives / Wahlpflichtfächer	1	Elective 1 (WP)	Wahlpflichtfach 1 (WP)	2	1	0	4
	3	Elective 2 (WP)	Wahlpflichtfach 2 (WP)	2	1	0	4
	3	Elective 3 (WP)	Wahlpflichtfach 3 (WP)	2	1	0	4
Summe				39	16	8	87
				63 SWS			Cr.

Annexe 3.6:

**Continuous Assessment Examinations in
the 'Computational Mechanics'**

Modul/Module	Sem.	Subject	Lehrveranstaltung/ Prüfungsgebiet	SWS			Cr.
				V	Ü	Pr.	
Mechanical Foundations	1	Continuum Mechanics	Kontinuumsmechanik	2	2	0	7
	2	Thermodynamics of Materials	Materialtheorie	2	2	0	7
Finite Element Method	2	Finite Element Method Foundation	Grundlagen der Finite Element Methode	2	2	0	7
	3	Nonlinear Finite Element Method	Nichtlineare Finite Element Methode	2	2	0	6
Mathematical Foundations	1	Tensor Calculus	Tensorrechnung	2	2	0	7
	1	Introduction to Numerical Methods	Einführung in die numerischen Methoden	2	2	0	7
Computer Languages for Engineers	1	Computer Languages for Engineers	Computersprachen für Ingenieure	2	2	0	5
Testing of Metallic Materials	1	Testing of Metallic Materials	Prüfung metallischer Werkstoffe	2	0	2	5
Non-Technical Subjects / Nicht technische Fächer	3	Soft Skills 1	Soft Skills 1	2	1	0	3
	3	Soft Skills 1	Soft Skills 1	2	1	0	3
Electives I/ Wahlpflichtfächer I	2	Elective I – 1	Wahlpflichtfach I – 1	2	2	0	5
	2	Elective I – 2	Wahlpflichtfach I – 2	2	2	0	5
	2	Elective I – 3	Wahlpflichtfach I – 3	2	2	0	5
Electives II/ Wahlpflichtfächer II	3	Elective II – 1	Wahlpflichtfach II – 1	2	2	0	5
	3	Elective II – 2	Wahlpflichtfach II – 2	2	2	0	5
	3	Elective II – 3	Wahlpflichtfach II – 3	2	2	0	5
Summe				32	28	2	87
				62 SWS			

Annexe 4:

Guidelines to the Regulations Governing the Transition from the B.Sc. to the M.Sc. Programme within ISE

	Computer Engineering M.Sc.	Computer Science and Communications Engineering M.Sc.	Control and Information Systems M.Sc.	Electrical and Electronic Engineering M.Sc.	Mechanical Engineering M.Sc.	Computational Mechanics M.Sc.
Computer Engineering B.Sc.	-	-	20 (4)	24 (5)	30 (6)	6 (1)
Computer Science and Communications Engineering B.Sc.	-	-	14 (3)	-	30 (6)	6 (1)
Control and Information Systems B.Sc.	-	-	-	20 (4)	20(4)	6 (1)
Electrical and Electronic Engineering B.Sc.	20 (4)	10 (2)	10 (2)	-	30 (6)	6 (1)
Mechanical Engineering B.Sc.	30 (6)	20 (4)	16 (3)	26 (5)	-	-
Material Technology B.Sc.	30 (6)	20 (4)	26 (5)	30 (6)	-	6 (1)

The amount of credits or number of courses (in brackets) normally to be expected as a requirement to be fulfilled in moving from a B.Sc. subject to an M.Sc. subject within ISE applies to the additional core courses chosen in the M.Sc. subject in the corresponding amount as stated, as long as the admission prerequisites in accordance with the 'Course Regulations' and the 'Examination Regulations' are fulfilled (a grade-point average of at least 2.5 or better on the previous B.Sc. subject). A legal claim to recognition of credits and admission to the M.Sc. programme on the basis of the above table, which merely serves as guidelines, cannot be asserted. For this reason student counselling prior to applying for admission is strongly recommended.

Annexe 5:
Guidelines for an External B.Sc.*

M.Sc. Subject in ISE	Completion of a Subject in the Scope of the Framework Act of Higher education:	Completion of a Subject at the University of Duisburg-Essen in:
Computer Engineering	Electrical Engineering Communications Engineering Computer Science	Electrical Engineering or Electrical Engineering and Information Engineering (D I and D II) Applied Computer Science (D II)
Electrical and Electronic Engineering	Electrical Engineering Communications Engineering Energy Management Control Engineering	Electrical Engineering or Electrical Engineering and Information Engineering (D I and D II)
Mechanical Engineering	Mechanical Engineering Materials Engineering Civil Engineering Chemistry	Mechanical Engineering or Mechanical Engineering and Plant Construction (D I, D II and B.E.) Metallurgy and Foundation Technology (Diplom FH) Applied Materials Engineering (B.E.)
Computer Science and Communications Engineering	Electrical Engineering Communications Engineering Computer Science	Electrical Engineering or Electrical Engineering and Information Engineering (D I and D II) Applied Computer Science (D II)
Control and Information Systems	Electrical Engineering Electrical Engineering and Information Engineering Mechanical Engineering Automation Engineering	Electrical Engineering or Electrical Engineering and Information Engineering (D I and D II) Applied Computer Science (D II)
Computational Mechanics	Electrical Engineering Communications Engineering Computer Science	Electrical Engineering or Electrical Engineering and Information Engineering (D I and D II)

*As a rule such a degree can serve as a prerequisite for admission to the M.Sc. programme in ISE.

For the admission to the M.Sc. programme within ISE of students with a first degree from a German university, the completion of the subjects listed above with at least a six-semester period of study is normally regarded as sufficient; recognition of foreign degrees follows a similar procedure. A legal claim to recognition of credits and admission to the M.Sc. programme on the basis of the above table, which merely serves as guidelines, cannot be asserted. For this reason counselling in a specific subject before applying for admissions is thus strongly recommended.