

**Examination regulations
for the Master's degree courses
in Chemical Engineering and Biochemical Engineering
at the Faculty of Biochemical and Chemical Engineering
of the Technische Universität Dortmund
dated of May 6th 2013**

According to § 2 paragraph 4 in connection with § 64 paragraph 1 of the Law of institutions of higher education in the federal state of North Rhine–Westphalia [HG – Hochschulgesetz NRW – Higher Education Act] dated of October 31st 2006 (GV. NRW p. 474), last amended by the law dated of December 18th 2012 (GV. NRW p. 672), the Technische Universität Dortmund has issued the following regulations:

Table of Contents

I. General Information

- § 1 Validity of the Master's degree examination regulations
- § 2 Purpose of study
- § 3 Entry requirements
- § 4 The Master's degree
- § 5 Credit point system
- § 6 Standard period of studies and range of studies
- § 7 Examinations and compensation for a permanent physical injury or disability
- § 8 Repetitions of examinations, passing the Master's examination, definitive failure of the examination
- § 9 Examination board
- § 10 Examiners and assessors
- § 11 Accreditation of previous requirements, advancement into higher semesters
- § 12 Absence, withdrawal, fraud, violation of the rules

II. The Master's examination

§ 13 Admission to the Master's examination

§ 14 The Master's examination

§ 15 Evaluation of required examinations, acquisition of credit points, calculation of grades

§ 16 The Master's thesis

§ 17 Acceptance and evaluation of the Master's thesis

§ 18 Additional qualifications

§ 19 Transcript, attestations for a change of universities

§ 20 The Master's diploma

III. Final Provisions

§ 21 Invalidation of a Master's examination, withdrawal of a Master's degree

§ 22 Viewing of examination records

§ 23 Application area, starting date and publication of the new regulations

Appendix 1: Compulsory modules and compulsory electives of the Master's degree courses in Biochemical Engineering, Master's degree courses in Chemical Engineering, and Master's degree courses in Chemical Engineering in the area of study Process Systems Engineering

Appendix 2 : Schedule of the Master's degree programmes

Appendix 3 : Form of the transcript in Biochemical Engineering and Chemical Engineering,

I. General Information

§ 1

Validity of the Master's degree examination regulations

- (1) The Master's degree examination regulations shall apply to the Master's degree programme in chemical or biochemical engineering at the Faculty of Biochemical and Chemical Engineering of the Technische Universität Dortmund. They will follow the structures of the Master's degree studies according to § 64 paragraph 1 of the law of institutions of higher education in the federal state of North Rhine-Westphalia [HG – Hochschulgesetz NRW – Higher Education Act].
- (2) The module descriptions show the different programme details, teaching contents, and competences to be acquired. They do not form part of these regulations. They shall be determined by the competent Faculty Council and must be indicated to the Rectorate.

§ 2

Purpose of Study

The Master's degree programme prepares students for scientific work. When the student successfully completes the Master's degree programme another professional qualifying degree will be awarded. By successfully completing their Master's degree the candidates give proof of their professional competence and have access to the following professional branches:

- Scientific professions in industry, administration and research institutes
- Research work with a view to taking a doctoral degree
- Change to another university in Germany or abroad for further scientific research

§ 3

Entry Requirements

Candidates who fulfil the requirements of the admission regulations for the Master's degree courses in Chemical and Biochemical Engineering at the Faculty of Biochemical and Chemical Engineering of the Technische Universität Dortmund shall be admitted to

the Master's degree programme in chemical engineering and biochemical engineering.

§ 4

Master's Degree

After the successful completion of the Master's examination the faculty shall confer the academic degree Master of Science (M. Sc.) for Chemical Engineering or Biochemical Engineering.

§ 5

Credit point system

- (1) The programme is based on a credit point system which is compatible with the European Credit Transfer System (ECTS).
- (2) To each module depending on its study attainment a specific number of credit points is attributed. Within the meaning of these examination regulations one credit point shall be awarded for a study achievement which represents a workload of approximately 30 hours. As a rule students must obtain 30 credit points per semester.
- (3) Credit points are normally awarded on the basis of successfully completed modules.

§ 6

Standard period of studies and range of studies

- (1) The standard period of Master's degree studies is three semesters and includes the completion of the Master's thesis.
- (2) The Master's degree programme includes a total of 90 credits or 2700 working hours, which are divided among compulsory subjects, compulsory electives and free electives.
- (3) Students who have chosen the branch of study "Process Systems Engineering" in the Master's programme of Chemical Engineering must bring proof that they have taken a module "Group project" as a term assignment including a presentation in the Bachelor's studies. If a module "Group project" as a term assignment with a presentation representing an extent of 10 credit points has not been completed in the Bachelor's studies such a module must be completed successfully as an

additional compulsory module in the Master's programme. The extent of free electives is then reduced correspondingly by 10 credit points.

- (4) The programme is divided into modules that have to be completed within two semesters. These modules consist of related courses, self standing in contents and time, which normally represent an extent of 5 credit points. The recommended scheduling of the different subjects of the Master's programme can be found in the appendix 2.
- (5) The compulsory modules and compulsory electives of the Master's programme are listed in the appendix 1. The free electives shall be posted through announcements displayed on a board.
- (6) The courses of the compulsory modules, compulsory electives and free electives can be offered either in German or English.
- (7) The Master's programme optionally starts in the summer or winter semester. For students who have completed a Bachelor's programme of six semesters at another university the Master's programme will cover four semesters. It shall consist of the three-semester Master's programme and additional requirements amounting to 30 credit points. Further particulars will be regulated by the admission regulations.

§ 7

Examinations and compensation for a permanent physical injury or disability

- (1) Each module shall be completed by at least one examination requirement. As a rule the examinations shall be taken after the student has completed all the courses in a module (module examination). Individual requirements can also be fulfilled in a cumulative way to complete a module. The individual requirements can be fulfilled in the framework of individual courses. The respective forms of examinations are shown in the appendix 1.
- (2) Modules, which were part of a Bachelor's examination in a comparable form, can't be part of a Master's examination except for additional qualifications that were completed in the Bachelor's programme.
- (3) Examinations for the courses that are taught in English can be taken either in German or in English depending on the students' individual choice.
- (4) The module examinations and individual requirements shall be integrated into the course and consist of written examinations, papers or seminar arrangements, term assignments, oral examinations or presentations with or without discussion and specific practical examinations. The responsible tutors, with the consent of the

examination board, can chose to determine other appropriate forms of examinations.

- (5) The nature, form and extent of the module examinations and individual requirements are shown in the tables of the appendix 1 or the module descriptions of the module handbook or will be announced by the examiners at the latest two weeks after the beginning of the course.
- (6) The responsible tutors / examiners shall announce the examination dates promptly at the beginning of the courses. The registration procedures and terms for module examinations and individual requirements shall be determined by the examination board. The students must legally register for the examinations one week prior to the examination date. Further details concerning registration for the examinations shall be announced by the responsible tutors at the beginning of the courses.
- (7) The written examinations of the module examinations shall last a minimum of two and a maximum of four hours, and the oral examinations' time from 15 to a maximum of 45 minutes. For individual requirements the written examinations shall cover a minimum time of one and a maximum of three hours, the oral examinations a minimum of 15 and a maximum of 30 minutes.
- (8) The written examinations shall be written under ward and are not public. Tools that may be allowed shall be announced in due time by the respective tutors prior to the examination.
- (9) The written examinations may be written completely or partly as a multiple choice test. Especially when using this form of assessment attention must be paid to assuring that the examination tasks take into account the contents taught in the modules or courses and the necessary knowledge to guarantee reliable examination results. The examination tasks shall be elaborated by two examiners together. They shall concurrently determine which answers shall be recognised as correct.
- (10) Written examinations shall normally be evaluated by two examiners. If the examination is the last possible attempt at retaking or if a programme shall be completed by an examination the results always have to be evaluated by two examiners (§ 65 paragraph 2 HG) [Hochschulgesetz: Higher Education Act]. In addition, oral examinations will be held in front of several examiners or one examiner and one expert assessor as individual or group examinations. The results of the written examinations shall be announced to the students at the latest six weeks after the test.

- (11) The essential points and results of the oral examination shall be recorded in a protocol. Before the examiner determines the grade he or she shall hear the assessor's opinion. The result of the examination shall be announced to the students right after the oral examination. Students who want to pass the same examination at a later date shall be admitted as auditors provided there is enough room and the examined student does not object. The admission does not include the discussion and announcement of the examination grade.
- (12) In modules that are completed with a module examination or individual requirements, students may be asked to perform additional work during the different courses. This may consist of papers, written examinations, term assignments, practical work, practical exercises, oral tests, lectures and protocols or portfolios. Concerning form and contents the requirements of the additional study work remain well below the requirements of an examination. If this additional work is not defined in the module descriptions, the tutors shall announce it at the beginning of the course. Assignments can be marked by a grade or evaluated as "pass"/"fail". Participation in the additional study work may also be declared as optional. To be admitted to the module examinations, the student must have completed all the assignments required for the module and not optionally performed.
- (13) For courses (except for lectures) that require an active participation of the students to achieve the specific learning objectives attendance may be mandatory. The responsible tutors, with the consent of the examination board, shall determine the attendance according to the principle of proportionality. The exact rules of a mandatory attendance will be announced to the students at the beginning of the course in an appropriate form.
- (14) If a student credibly proves by means of a medical certificate that he/she is not able to write an examination completely or partly as provided for because of a long and permanent or constant handicap or a chronic disease, the chairman of the examination board may allow the student to take an equivalent examination in another form or length of time. If there are doubts, the competent person or office for questions concerning handicapped students of the Technische Universität Dortmund (e. g. Dortmund Zentrum Behinderung und Studium [Dortmund Office for Handicap and Studies]) shall be involved. The examination procedure shall consider legal maternity periods and downtimes due to care for residing children who have to be looked after most of the time, for the wife/the husband, the registered life partner, or persons to who the student is related in straight line of descent or a relative in the first degree, as far as those need long-term care.

§ 8

Repetition of examinations, passing the Master's examination, definitive failure of the examination

- (1) The examinations can be repeated, if they are not passed or are not considered as passed, twice. If an individual requirement is not passed only this has to be repeated. Passed examinations cannot be repeated. If compulsory electives and free electives are not passed they can be replaced by successfully completing other compulsory electives and free electives.
- (2) By way of derogation from paragraph 1 the Master's thesis can only be repeated as a whole and then only once.
- (3) The Master's examination shall be passed when all 90 credits for the required examinations, the laboratory courses and the Master's thesis were acquired.
- (4) The Master's examination shall be regarded as definitely failed if
 1. the Master's thesis after repetition is again not passed or is not considered as passed
 2. The candidate cannot acquire the necessary minimum number of credit points in one or several of the modules.
 3. A compulsory module was definitely failed.
- (5) If the Master's examination or an examination is regarded as definitely failed the chairman of the examination board will give the candidate a written notification. The notification shall be provided with a plea instruction. On request the candidate shall be issued a certificate concerning the successfully passed examinations; a supplement is added that this certificate does not apply for a presentation at another university.

§ 9

Examination board

- (1) An examination board shall be established and be in charge of the organization of the examinations and the tasks assigned by these examination regulations.
- (2) An examination board in accordance with paragraph 1 consists of seven members: four members of the group of professors, one member of the group of the scientific assistants, and two members of the group of students. The members are separately elected by the Faculty Council according to the groups for two years, the members of the students' group for one year. The Faculty Council elects the

members of the examination board with exception of the chairman and his/her vice chairman.

- (3) The examination board elects the chairman and the vice chairman from its members of the group of professors. Re-election is admissible.
- (4) The examination board shall make sure that the provisions of the examination regulations are maintained and shall provide for the proper administration of the examinations. It is especially responsible for the arbitration of objections made against decisions that were taken during the examination procedure and for the resolution of questions and problems that concern all the faculties. In addition, the examination board has to report regularly to the faculty, at least once a year, on the development of the examinations and study periods. It submits suggestions for the reform of the examination regulations, study regulations and study plans. The examination board can assign the completion of specific tasks during the current business (e. g. questions of recognition, urgent decisions etc.) to the chairman; this does not apply, however, to decisions regarding objections and to the report to the faculty.
- (5) The examination board shall have a quorum if – besides the chairman or his/her representative and one additional professor – at least two additional members entitled to vote are present. It shall decide with a simple majority. In case of a tie, the vote of the chairman shall decide. The student members of the examination board shall not participate in educational–scientific decisions, especially in the judgement, acknowledgement or apportionment of study and examination requirements, in the specification of the examination tasks and in the appointment of the examiners and assessors.
- (6) The members of the examination board shall have the right to attend the examinations.
- (7) The meetings of the examination board are not public. The members of the examination board, the examiners and the assessors shall be subject to confidentiality. Unless they are employed in the civil service, they must swear an oath of confidentiality to the chairman of the examination board.
- (8) To carry out its current administration tasks the examination board shall rely on the Central Examination Office.

§ 10

Examiners and Assessors

- (1) The examination board shall appoint the examiners according to the legal provisions. The examination board can confer the appointment upon the chairman. All professors as well as additional persons entitled to give examinations within the provisions of § 65 paragraph 1 HG [Hochschulgesetz: Higher Education Act] can be appointed as examiners. A person is allowed to be appointed an assessor if he/she has passed the appropriate Diplom or Master's examination in the respective area of studies or if he/she can bring proof of a relevant qualification.
- (2) The examiners shall work independently.
- (3) The candidates may nominate an examiner for the Master's thesis. If possible, the nominations of the students shall be taken into consideration. However, the nominations of the students do not substantiate a claim.

§ 11

Accreditation of previous achievements, advancement into higher semesters

- (1) Previous achievements in the same field and programme at other universities within the scope of the Grundgesetz [Basic Law for the Federal Republic of Germany] shall be accepted without any equivalence test.
- (2) Previous achievements in another field and programme at the Technische Universität Dortmund or at other universities within the scope of the Grundgesetz [Basic Law for the Federal Republic of Germany] shall be accredited if equivalence is asserted. Achievements completed outside the scope of the Grundgesetz [Basic Law] shall be accredited upon request if equivalence is asserted. Equivalence shall be asserted if these achievements correspond essentially to those of the appropriate programme at the Technische Universität Dortmund in content, scope and requirements. There is no schematic comparison, but an overall view and overall assessment shall be made. The equivalence agreement approved by the Kultusministerkonferenz [Standing Conference of the Ministers of Education and Cultural Affairs of the Länder] and the Hochschulrektorenkonferenz [German College Rectors' Conference] as well as agreements in the framework of universities' partnerships shall be considered for the equivalence of previous achievements at foreign universities. In addition, the central office for foreign education can be consulted if equivalence is doubted.
- (3) Credit points which had been granted within the scope of the 'European Credit Transfer System' (ECTS) shall be accredited if the necessary qualifications are

fulfilled. Prior to studying abroad the student shall make a written agreement with an authorised representative of the examination board and a representative of the teaching staff at the host university arranging the extent and manner for granting the provided credit points unless the exchange takes place within the framework of a cooperation agreement.

- (4) Paragraphs 1 and 2 apply for accrediting previous achievements in state-approved distance learning or in distance learning units developed by the state of North Rhine-Westphalia in co-operation with the other federal states and the Federal Government.
- (5) Applicants who are entitled to enter the programme in a higher semester due to an assessment examination in accordance with § 49 paragraph 12 HG [Hochschulgesetz – Higher Education Act] will be placed according to the knowledge and abilities proven in the assessment examination for their previous achievements in the Master's examination. The certificate's statements concerning the results of the assessment examination shall be binding for the examination board.
- (6) Achievements which are not equivalent according to paragraphs 2 to 5 but which were provided within the scope of the Basic Law or in a country which has ratified the "Convention on the Accreditation of Qualifications concerning Higher Education in the European Region" (Lisbon Accreditation Convention dated of April 11th 1997) shall be recognised on the basis of the acquired knowledge and skills even if no substantial difference to the achievements of the programme is determined for which the accreditation was applied for.
- (7) The examination board can accept a corresponding job activity as an internship.
- (8) When accrediting achievements in equivalent or related programmes not only passed, but also failed examinations shall be considered.
- (9) The examination board shall be responsible for accreditation according to paragraphs 1 to 8. The responsible specialised representatives shall be consulted prior to assessment of equivalence or non-essential differences.
- (10) If previous achievements are accredited, the grades – as far as the grade systems are comparable – shall be adopted and incorporated in the calculation of the final grade. In case of incomparable grade systems, the remark "passed" shall be recorded. Accreditation shall be indicated in the diploma.
- (11) If the qualifications of paragraphs 1 to 6 are fulfilled, there is a legal right to accreditation. Accreditation of previous achievements which were made in the scope of the Grundgesetz [Basic Law] shall be effected officially. The students

must submit the required documents for accreditation. Based on the previous achievements according to paragraphs 1 to 7, a maximum of 30 credits may be granted.

§ 12

Absence, Withdrawal, Fraud, and violation of the rules

- (1) An examination result shall be deemed “not sufficient” (5.0) if the student does not appear for the examination without good reason or if he/she withdraws from the examination after it has started without good reason. This shall also apply if the written examination has not been completed within the allotted time.
- (2) The reasons for the withdrawal or the absence must be presented and substantiated to the examination board in writing without any delay. If the student or a child for who the student is in charge most of the time is ill, he/she must submit a medical certificate. If the student is ill the medical certificate must indicate the diagnostic findings in a readily comprehensible way and attests to the inability to take the examination. If the examination board is not prepared to accept the reasons, the student shall be informed in writing.
- (3) If the student tries to affect the result of an examination by cheating (ex. using impermissible aids, adopting text passages without rendering them as quotations, cribbing etc.) the respective examination shall be deemed “not sufficient” (5.0). The decision of whether it is an act of cheating shall be made by the examiner. If an attempted cheating in the sense of sentence 1 is detected by the supervisor during an examination, he/she can exclude the candidate from the respective examination. In this case the examination result shall be marked as “not sufficient” (5.0). If a candidate disturbs the proper administration of the examination, he/she can be kept from completing the examination after dissuasion by the examiner or supervisor in charge; in this case, the appropriate examination result shall be deemed “not sufficient” (5.0). The reasons for the decision shall be recorded in the student’s file. In serious cases of fraud and disturbance, the examination board can exclude the student from subsequent examinations.
- (4) The examination board can ask that the candidates – or in a group project the candidate’s share of the work – make a written declaration, that the work was done independently and that no sources or aids were used other than those indicated and that quotations and paraphrases were properly indicated. § 16 paragraph 10 shall remain unaffected.

- (5) Within a period of 14 days the candidate can appeal the examination board's decision according to paragraph 3. The student shall be informed of incriminating decisions immediately and in writing. Such decisions shall be justified and provided with instructions on right to appeal. Prior to the decision the candidate shall be given the possibility of a fair hearing.

II. The Master's examination

§ 13

Admission to the Master's examination

- (1) Students enrolled at the corresponding Master's degree programme for Chemical Engineering or Biochemical Engineering or as second priority student according to § 52 paragraph 2 HG (Hochschulgesetz – Higher Education Act) shall be deemed admitted to the Master's examination unless admission has to be refused according to paragraph 2.
- (2) Admission shall be refused if:
1. the candidate definitely failed the Master's examination in a same or an equivalent programme or an examination in the compulsory modules mentioned in the appendix or
 2. an examination has been taken in one of the aforementioned degree programmes but due to a contestation of the examination result an enforceable and legally binding decision concerning the definitive failure is not yet available.

§ 14

Master's examination

- (1) The Master's examination consists of required examinations in which a total of 60 credit points must be acquired. The distribution is shown in the appendix. Another 30 credit points must be acquired through the Master's thesis.
- (2) In the Master's degree programme "Chemical engineering" the programme "Process systems engineering" can be chosen. In the programme "Process systems engineering" all the compulsory courses, the "PSE Lab" and a sufficient number of free electives are offered in English.

- (3) The compulsory modules or compulsory electives and the corresponding credit points are shown in the appendix.

§ 15

Evaluation of required examinations, acquisition of credit points, calculation of grades

- (1) The grades on the examinations and individual requirements shall be determined by the respective examiner. For the evaluation the following grades shall be used:

1 =	very good	=	excellent
2 =	good	=	an achievement that is considerably above the average requirements
3 =	satisfactory	=	an achievement that meets the average requirements
4 =	sufficient	=	an achievement that satisfies the requirements in spite of its defects
5 =	not sufficient	=	an achievement that does not satisfy the requirements because of significant defects

Interim grades can be calculated for the required examinations by decreasing or increasing the grades by 0.3; however, the grades 0.7, 4.3, 4.7 and 5.3 are excluded.

- (2) The number of credit points assigned to each module shall be acquired if the module was completed with a grade of at least “sufficient” [4.0], or “passed”.
- (3) A written examination which was completed exclusively according to the multiple choice procedure shall be considered as passed if
- 50% of the total number of points to be achieved were reached or
 - the number of points achieved is not more than 22% less than the average examination result of the candidates who participated in the examination.
- (4) If the candidate reached according to paragraph 3 the minimum number of points and thus passed the examination the grades are as follows:
- 1 = *very good*, if she or he achieved at least 75%
- 2 = *good*, if she or he achieved at least 50% but less than 75%
- 3 = *satisfactory*, if she or he achieved at least 25% but less than 50%

4 = *sufficient*, if she or he achieved no or less than 25%

of the points to be achieved above the minimum number of points.

- (5) If a written examination was completed only partly according to the multiple choice procedure the tasks completed according to the multiple choice procedure shall be evaluated as shown in the paragraphs 3 and 4. The remaining tasks shall be evaluated according to the procedures that normally apply to them. Both evaluations shall determine the grade of the written examination whereby the proportions of the respective total number of points to be achieved shall be taken into account.
- (6) If the module is completed with a module examination the grade on the examination is the grade for the module. For individual requirements the module grade shall be calculated from the arithmetic average of the non-rounded grades of the individual requirements in the various modules whereby the grades of the individual requirements shall be weighted according to the number of corresponding credit points. In addition, upon request of the students optional term-accompanying study requirements may be considered in the fixing of the module grade provided the module examination or individual requirements were passed with at least sufficient results. The module grade shall then be calculated to at least 75% from the grade achieved in the module examination respectively the arithmetic average of the individual requirements and up to 25% from the arithmetic average of the grades of the maximum three optional term-accompanying study requirements.

The module grades are as follows in words:

an average of up to 1.5	= very good
an average of over 1.5 up to 2.5	= good
an average of over 2.5 up to 3.5	= satisfactory
an average of over 3.5 up to 4.0	= sufficient
an average of over 4.0	= not sufficient

Only the first decimal place after the comma shall be taken into consideration when calculating the module grade. All subsequent decimal places will be cancelled without rounding.

- (7) The overall grade for the Master's examination shall be calculated from the arithmetic average of the non-rounded module grades (including the Master's

Thesis) so that the individual module grades shall be weighted according to the number of credit points. Paragraph 6 applies accordingly.

- (8) The final grade shall also be reported in form of a grade corresponding to the grading system of the European Credit Transfer System (ECTS). In addition to this ECTS grades may be reported for all assessed examination requirements. However, this requires a corresponding decision to be taken by the examination board. The grades corresponding to the ECTS system shall be reported as follows:

A = usually the best approx. 10% of all successful students;

B = usually the next approx. 25% of all successful students;

C = usually the next approx. 30% of all successful students;

D = usually the next approx. 25% of all successful students;

E = usually the next approx. 10% of all successful students;

- (9) The ECTS grade is generally calculated by comparing the results of the cohorts over the last six terms. If this group is smaller than 50 persons a reference group from the last 10 terms must be determined. The current term shall generally not be taken into consideration. As long as no statistical data is available to complete a relative evaluation, no ECTS grades are reported. To assure legally binding grades the examination board may decide not to report ECTS grades. Appropriate information shall be provided in the final document. Regarding the composition of the comparison group distinctions shall be made depending on the degree and the study programme. In addition, if objectively justified, a different composition of the comparison group may be allowed. However, this requires a corresponding decision to be taken by the examination board.

§ 16

Master's Thesis

- (1) The Master's thesis should show that within a stipulated time the candidate is able to address a problem of a subject relating to his or her field of study independently and according to scientific methods. The candidate can submit suggestions for the subject of the thesis. The subject of the thesis shall be assigned by the examination board. The date of this assignment shall be recorded.
- (2) The Master's thesis can be started after the acquisition of 53 credits. By writing the Master's thesis students acquire 30 credits.

- (3) According to a mutual agreement between the examiner and the student, the Master's thesis can be written either in German or in English.
- (4) The Master's thesis can be assigned and supervised by any professor or any specialized senior scholar of the Faculty of Biochemical and Chemical Engineering. If the Master's thesis is completed in an institution outside of the Faculty of Biochemical and Chemical Engineering a professor of the Faculty of Biochemical and Chemical Engineering working in research and teaching must assure the supervision and evaluation as first supervisors. The students shall be given the chance to make suggestions for the subject of the Master's thesis and the supervisors. Other scientists meeting the requirements according to § 65 paragraph 1 HG Hochschulgesetz – Higher Education Act] can be appointed as supervisors upon approval of the examination board.
- (5) If a candidate cannot appoint a supervisor, the chairman of the examination board shall ensure that the candidate receives a subject and supervisor for the Master's thesis.
- (6) The Master's thesis must generally be completed as an individual work. But this does not exclude that a work group works together on the subject of the Master's thesis. However, it must be assured that the contribution being evaluated as an examination requirement by the single candidate is clearly distinguishable and appraisable and indicates a clear restriction based on specification of objective criteria and that it fulfils the requirements according to paragraph 1.
- (7) Preparation time for the Master's thesis is 26 weeks. The subject and tasks of the Master's thesis shall be limited by the supervisor in order to make sure that the deadline for preparing the Master's thesis can be adhered to. In individual cases upon request if justified by the candidate, the chairman of the examination board in accordance with the supervisor can lengthen the preparation time up to four weeks. The application for an extension must be made to the examination board at least 14 days prior to the expiration of the preparation time.
- (8) The subject of the Master's thesis can be rejected only once and only within the first month of the preparation; at that point the Master's thesis shall be considered as not started.
- (9) The length of the Master's thesis shall not exceed approx. 80 pages.
- (10) When submitting the Master's thesis, the candidate must swear on oath that she/he did her/his work independently and that she/he used no other sources and aids than those indicated and that she/he properly indicated all quotations and paraphrases. For the declaration on oath a standard form issued by the Central

Examination Office must be used. Upon submission of the Master's thesis the declaration shall be signed and delivered as an intergral part of the Master's thesis.

§ 17

Acceptance and Evaluation of the Master's Thesis

- (1) The Master's thesis shall be submitted in duplicate to the examination board within the time limit, in addition, it shall be submitted in an electronical version suited for plagiarism-detection software; the date of submission shall be recorded. In case of delivery by mail, the date of postmark is decisive. If the Master's thesis is not submitted within the time limit, it shall be deemed as "not sufficient" (5.0).
- (2) The Master's thesis shall be examined and evaluated by two examiners. One of the examiners shall be the person who supervises the thesis. The second examiner shall be appointed by the chairman of the examination board. Each evaluation shall be effected according to § 15 paragraph 1 and must be justified in writing.
- (3) The grade of the Master's thesis shall be composed of the arithmetic average of the single evaluations unless the difference is more than 1.0. If the difference is more than 1.0, the examination board shall appoint a third examiner for the evaluation of the Master's thesis. In this case, the grade of the Master's thesis shall be composed of the arithmetic average of the two better grades. However, the Master's thesis can only be evaluated as "sufficient" or better if at least two of the grades are "sufficient" or better. § 15 paragraph 6 applies accordingly.
- (4) The office of examination affairs must receive the evaluation of the Master's thesis not later than 2 months after the date of submission.

§18

Additional Qualification

- (1) Prior to the passing of an examination or the definitive failure, the students can take additional examinations in other modules than the compulsory ones.
- (2) The determination of the final grade shall, as far as possible, take into account the examination with the best grade unless the student applies for another form of evaluation. Apart from that, upon request, the results of the examinations in

these additional subjects shall be recorded in the transcript. However, they shall not be included in the calculation of the final grade.

§ 19

Transcript, Attestations for a change of universities

- (1) The candidate shall receive a transcript of the successful Master's examination according to the appendix at the latest four weeks after the evaluation of the last examination. The transcript shall include the date on which the last examination was passed. The transcript shall show the final grade of the Master's examination, including the grades according to the European Credit Transfer System according to § 15 paragraph 1, the subject and the grade of the Master's thesis, the modules and module grades as well as the number of credit points acquired in the individual modules. The designations of the modules and individual requirements of the modules as well as the lecturers shall be indicated.
- (2) Upon request from the candidate the transcript can show additional studies, which have not been calculated into the module and final grade because they exceeded the maximum limit of credit points within one module.
- (3) The transcript shall include a supplementary diploma. It shall specify the character, content and qualification level of the programme as well as the various courses and examination requirements. It shall contain information about the university and the university system. The supplementary diploma shall be issued in German and English. In addition, a survey of the completed achievements shall be attached to the transcript.
- (4) Upon request from the candidate, prior to the completion of the Master's examination, a certificate shall be issued attesting to the passed examinations (Notenbescheinigung [Certificate of grades]) including a list of the successfully passed modules with the acquired credit points and passed examinations and the grades according to § 15 paragraph 1. The candidates can apply for such a certificate only once in a semester.
- (5) The transcript shall be signed by the chairman of the examination board.
- (6) Upon request from the candidate in consultation with the examination board, the transcript and the attestations can also be issued in English.

§ 20

Master's diploma

- (1) The candidate shall receive a Master's diploma effective from the date on the transcript. The Master's diploma shall certify to the conferring of the Master's degree according to § 4. § 19 paragraph 6 applies accordingly.
- (2) The Master's diploma shall be signed by the dean of the Faculty of Biochemical and Chemical Engineering and the chairman of the examination board and shall be affixed with the seal of the faculty.

III. Final Provisions

§ 21

Invalidity of a Master's examination, Withdrawal of a Master's degree

- (1) If the candidate cheated on an examination and this fact is revealed only after the conferral of the transcript, the examination board shall have the right to rectify ex post the grades of those examination requirements on which the candidate cheated and declare the examination to be completely or partly failed.
- (2) If the qualifications for admission to an examination were not fulfilled but the candidate was not guilty of deception and if this fact is revealed only after the conferral of the transcript, this fault can be corrected by passing the examination. If the candidate wrongly and deliberately effected admission, the examination board shall decide on the legal consequences taking into account the Administrative Procedure Act for the Federal State of North Rhine–Westphalia.
- (3) Before a decision according to paragraph 1 and 2 is reached, however, the candidate concerned shall be given the chance to make an oral or written statement.
- (4) If a decision according to paragraph 1 and paragraph 2 sentence 2 is taken the invalid transcript shall be confiscated and, if necessary, a new transcript shall be issued. According to paragraph 1 and paragraph 2 sentence 2, reaching a decision is impossible after a period of 5 years from the date of issue of the transcript.

- (5) The Master's degree can be withdrawn and the document confiscated if it later turns out that it was acquired by fraud or if substantial conditions for its awarding were erroneously regarded as fulfilled. On the withdrawal, however, the Faculty Council of the Faculty of Biochemical and Chemical Engineering shall decide.

§ 22

Viewing of Examination Records

- (1) After the announcement of the results of the written examination of one examination section, the candidate shall be allowed to view the written examinations. The date and place of the viewing shall be fixed by the examiners and announced by posting on a board at the latest on the day of the examination.
- (2) Viewing of further written examinations, the corresponding comments of the examiners and the examination protocols of the oral examinations shall be allowed upon request.
- (3) The application must be made within three months of announcement of the examination results to the chairman of the examination board. The date and place of the viewing shall be fixed by the chairman of the examination board.

§ 23

Application area, starting date and publication of the new regulations

- (1) These examination regulations shall be published in 'Amtliche Mitteilungen' of the Technische Universität Dortmund and go into effect on October 1st, 2012.
- (2) These examination regulations shall apply to all students enrolled in the Master's degree courses for Biochemical and Chemical Engineering at the Technische Universität Dortmund.

Issued on the basis of the decisions of the Faculty Council of the Faculty of Biochemical and Chemical Engineering from April 24th, 2013 and the decisions of the Rectorate of the Technische Universität Dortmund from March 3rd, 2013

Dortmund dated May 6th , 2013

Technische Universität Dortmund

The Rector

University professor

Dr. Ursula Gather

Appendix 1: Compulsory modules and compulsory electives of the Master's degree courses in Biochemical Engineering, Master's degree courses in Chemical Engineering, and Master's degree courses in Chemical Engineering in the area of study Process Systems Engineering

Compulsory Modules of the Master's Degree Programme in Biochemical Engineering				
Module	Credit Points	Examination		
			Module examination	Individual requirements
Analytics	7	written examinations or oral examinations	x	
Process Performance Optimization	5	written examinations or oral examinations, tests		x
Process development	9	written examinations or oral examinations, tests	x	
Pharmaceutical Process Engineering	10	written examinations or oral examinations, tests		x
Molecular Biotechnology	10	written examinations or oral examinations, tests		x
Master's Thesis	30	Written preparation and final colloquium	x	

Compulsory electives of the Master's Programme in Chemical Engineering				
Modules with a total of at least 24 credit points must be chosen				
Module	Credit Points	Examination		
			Module examination	Individual requirements
Chemical Technology	5	written examination or oral examination, tests		x
Conceptual Design	4	written examination or	x	

		oral examination		
Mechanical engineering	5	written examination or oral examination, tests		x
Process Performance Optimization	5	written examination or oral examination, tests		x
Reaction Engineering	5	written examination or oral examination, tests		x
Fluid mechanics	5	written examination or oral examination, tests		x
Fluid separation processes	5	written examination or oral examination, tests		x
Numerical Mathematics	6	written examination or oral examination	x	
Compulsory Module of the Master's Programme in Chemical Engineering				
Master's Thesis	30	written preparation and final colloquium	x	

Compulsory Modules in the area of study Process Systems Engineering (PSE) of the Master's Programme in Chemical Engineering				
Module	Credit Points	Examination		
			Module examination	Individual requirements
Conceptual Design	4	written examination or oral examination	x	
Fluid Separations	4	written examination or oral examination	x	
Project Work*	10	term assignment, presentation	x	
Particle Technology	4	written examination or oral examination	x	
Modeling and Simulation	10	written examinations or oral examinations		x
Process Performance	5	written examination or		x

Optimization		oral examination		
PSE Lab	3	tests		x
Reaction Engineering	4	written examination or oral examination	x	
Master's Thesis	30	written preparation and final colloquium	x	

Appendix 2: Scheduling of the different programmes Master's degree courses in Biochemical Engineering

	Depending on the preceding programme demanding individual prerequisites with a total of 30 credit points, e. g.						
Pre-semester	<ul style="list-style-type: none"> - Biochemical reaction engineering - Biochemistry / Molecular biology - Higher mathematics IIIa - Thermodynamics 2 - Process dynamics and automation 						30
I							
	6	3	3	7	11		30
II	Molecular biotechnology	Analytics	Pharmaceutical process engineering	Process development	Free electives		
	4	4	7	2	5	8	30
III	Process performance optimization						
	Master's thesis						30

Master's degree courses in Chemical Engineering

Pre-semester	<p>Individual prerequisites with a maximum total of 30 credit points, e. g.</p> <ul style="list-style-type: none"> - Technical Chemistry - Organic chemistry (without laboratory courses) - Process dynamics and control (from the module Process dynamics and automation) - Fluid mechanics 2 (from the module Fluid mechanics and Transport processes CIW) - Higher mathematics IIIa 	30
I	<p>At least 24 credit points from compulsory electives and related laboratory courses:</p> <ul style="list-style-type: none"> - Chemical technology (Master) 5 - Mechanical process engineering (Master) 5 7,5-22,5 - Process performance optimization 5 - Reaction Engineering (Master) 5 Free 	30
II	<ul style="list-style-type: none"> - Fluid separation processes (Master) 5 electives - Fluid mechanics (Master) 5 - Conceptual Design 4 - Numerical mathematics 6 6,5-27,5 	30
III	<p style="text-align: center;">Master's thesis</p>	30

Master's degree courses in Biochemical engineering in the field of Process Systems Engineering

Pre-semester	I							
	Introduction to Process Balancing	Industrial Chemistry	Fundamentals of Chemical Engineering	Laboratory course	Language course German or English	Introduction to Process Dynamics and Control		
	5	4	8	4	4	5	30	
I	Fluid Separations	Reaction Engineering		Modelling and Simulation				
	4	4		10	2	10	30	
					PSE Lab	Free electives		
II	Particle Technology	Conceptual Design	Process Performance Optimization	Group project				
	4	4	5	10	1	6-16	30	
III	Master's thesis						30	30

Appendix 3:

**Form of a Master's Degree's Transcript of records in Biochemical Engineering and
Chemical Engineering**

Faculty of Biochemical and Chemical Engineering

Transcript of records

Mila Mustermann

born in Musterstadt, on March 3, 1992

Master of Science (M. Sc.) in Biochemical Engineering

Mila Mustermann, born in Musterstadt, on March 3, 1992

COMPULSORY MODULES	EXAMINER	CREDIT POINTS	GRADE	
Analytics		7	Satisfactory	2.7
Analytical Chemistry	Sickmann		Satisfactory	2.7
Bioanalytics	Sickmann		Satisfactory	2.7
Molecular Biotechnology		10	Satisfactory	3.1
Biothermodynamics	Sadowski		Satisfactory	3.3
Chemical Biochemical engineering	Schmidt, B. Bühler and K. Bühler		Satisfactory	3.0
System Biotechnology	Frick		Satisfactory	3.0
Pharmaceutical Process Engineering		10	Good	2.3
Product Design Laboratory Course	Waizel		Passed	
Pharmaceutical Biochemical engineering	Kayser		Good	2.3
Pharmaceutical Engineering and Process Engineering	Hagel and Kayser		Good	2.3
Process Performance Optimization	Engell and Dünnebier	5	Good	2.0
Process Development		9	Good	2.2
Processing Laboratory Course	Górak		Passed	
Bioprocess Simulation	Schembecker		Good	1.7
Bioprocess Engineering	Wichmann		Satisfactory	2.7

FREE ELECTIVES

Enzyme Technology and Food Engineering		9	Very good	1.5
Biocatalysis in Non-Conventional Media	del Amor Villa		Very good	1.3
Immobilized Enzymes and Their Technical Application	del Amor Villa		Good	1.7
Food technology	Müller		Good	1.7
Industrial Bioprocess Technology		4	Good	1.8
Strain Optimization and Fermentation	Karau		Good	2.3
Purification and Product Approval	Schwarz		Very good	1.3
Product Cleaning		6	Very good	1.3

Introduction to Crystallization	Schembecker	Very good	1.0
Technical Chromatography *	Schembecker	Good	1.7
Affinity Separation Procedures *	Schembecker	Passed	

* This study achievement was completed during the Bachelor's studies.

PREREQUISITES**

Chemical Equipment	Kockmann	5	Good	2.3
Higher Mathematics 3a	Blum	5	Good	2.0
Process Dynamics and Control	Engell	5	Good	1.7
Plant and Process Engineering	Schembecker	7	Good	2.3
Transportation Processes	Zeiner	5	Very good	1.0

**These courses were completed as a prerequisite for admission to the Master's programme and are not included in the calculation of the overall grade.

Mila Mustermann, born in Musterstadt, on March 3, 1992

MASTER'S THESIS	EXAMINER	CREDIT POINTS	GRADE	
<hr/>				
"Modulation of the DXP Pathway to Produce Monoterpenes in <i>Escherichia coli</i> "	Schmid	30	Very good	1.1

Overall grade: good (1.8)

ECTS grade: B

Credit points: 90

ADDITIONAL QUALIFICATIONS	EXAMINER	CREDIT POINTS	GRADE	
<hr/>				
In-Depth Studies in Biotechnology		4.5	Good	1.9
Biofilms in Technical Applications	K. Bühler		Good	2.3
Pharmaceutical Microbiology	Jusing		Very good	1.2

This module was not included when determining the overall grade.

Dortmund, September 30, 2012

The Chairman of the Examination Board at the Faculty
of Biochemical and Chemical Engineering

Prof. Dr.Ing. Rolf Wichmann

Transcript of records

Mila Mustermann

born in Musterstadt, on March 3, 1992

Master of Science (M. Sc.) in Chemical Engineering

Mila Mustermann, born in Musterstadt, on March 3, 1992

COMPULSORY ELECTIVES	EXAMINER	CREDIT POINTS	GRADE	
Chemical Technology	Behr	5	Good	2.3
Conceptual Design	Schembecker	4	Good	2.3
Process Performance Optimization	Engell	4	Vergy good	1.3
Fluid Mechanics		5	Good	2.0
Mathematical and Numerical Methods	Ehrhard		Good	2.3
for Flow and Transportation Processes (CFD)				
Measuring Technology in Fluids	Ehrhard		Good	1.7
Reaction Engineering	Agar	5	Very good	1.3

Free Electives

Chemical Processes		6	Good	2.0
Industrial Processes of Petrochemical Raw Materials	Behr		Good	2.3
Industrial Processes of Renewable Raw Materials	Behr		Good	1.7
Chemical Procedures		8	Good	1.8
Introduction to Catalysis *	Agar and Behr		Good	2.3
Chlorine Chemistry and Electrolysis	Agar and Jörissen		Very good	1.3
Principles of Process Design		14	Good	1.8
Simulation of Stationary Processes	Schembecker		Good	2.0
Simulation of Dynamic Processes	Schembecker		Very good	1.0
Bioprocess Simulation	Schembecker		Satisfactory	3.0
Cost and Efficiency Calculation	Dietz		Good	1.7
Principles of Micro-Process Engineering and Lab on a Chip		8	Good	1.7
Flows and Transportation in Microchannels *	Ehrhard		Passed	
Microstructure Technologies for Chip Manufacture	Neyer		Good	1.7
Micro-Process Engineering	Kockmann		Good	1.7

* These study achievements were completed during the Bachelor's studies.

PREREQUISITES**

Chemical Equipment	Kockmann	5	Good	2.3
Higher Mathematics 3a	Blum	5	Good	2.0
Process Dynamics and Control	Engell	5	Good	1.7
Plant and Process Engineering	Schembecker	7	Good	2.3
Fluid Mechanics 2	Ehrhard	3	Good	2.3
Transportation Processes	Zeiner	5	Very good	1.0

**These courses were completed as a prerequisite for admission to the Master's programme and are not included in the calculation of the overall grade.

Mila Mustermann, born in Musterstadt, on March 3, 1992

MASTER'S THESIS	EXAMINER	CREDIT POINTS	GRADE	
"Characterization of Microreactors"	Agar	30	Very good	1.0

Overall grade: good (1.6)

ECTS grade: A

Credit points: 120

ADDITIONAL QUALIFICATIONS	EXAMINER	CREDIT POINTS	GRADE	
Fundamentals of Dimensioning Thermal Separators	Mackowiak	4	Good	2.3
Polymer Thermodynamics	Sadowski	4	Good	1.7
Efficient Energy Use in Process Engineering	Kühl	3	Very good	1.0

This module has not been included when determining the overall grade.

Dortmund, September 30, 2012

The Chairman of the Examination Board at the Faculty
of Biochemical and Chemical Engineering

Prof. Dr.Ing. Rolf Wichmann

Transcript of records

Gauri Bhagavad

born in Mumbai, India, on February 4, 1992

Master of Science (M. Sc.) in Chemical Engineering

Area of Studies: Process Systems Engineering

Gauri Bhagavad, born in Mumbai, India, on February 4, 1992

COMPULSORY MODULES	EXAMINER	CREDIT POINTS	GRADE	
Conceptual Design	Schembecker	4	Good	2.0
Fluid Separations	Lutze	4	Good	2.0
Project Work	Schembecker	10	Good	1.7
Modelling and Simulation		10	Good	2.0
Dynamic Models	Engell		Good	2.0
Data-Based Dynamic Modelling	Engell		Very good	1.0
Steady-State Simulation	Schembecker		Satisfactory	3.0
Dynamic Simulation	Engell		Good	1.7
Particle Technology	Walzel	4	Good	1.7
Process Performance Optimization	Engell	5	Good	2.0
PSE Lab	Wichmann	3	Passed	
Reaction Engineering	Agar	4	Satisfactory	2.7

FREE ELECTIVES

Advanced Reactor Technology	Agar	5	Very good	1.3
Bioprocess Development	Schembecker	7	Good	1.7
Bubbles, Films and Drops in Chemical and Biochemical Processes	Walzel	3	Good	1.7
Project Work	Schembecker	10	Good	1.7
Waste and Resource Management a Challenge for Engineers	Neukirchen	2	Satisfactory	2.7

PREREQUISITES*

Industrial Chemistry	Jörissen	4	Good	2.3
Fundamentals of Chemical Engineering		8	Good	1.9

Fluid Mechanics and Heat Transfer	Ehrhard		Very good	1.3
Introduction to Fluid Separation	Górak		Good	2.3
Introduction to Process Balancing	Agar	5	Good	2.0
Introduction to Process Dynamics and Control	Engell	5	Good	1.7
Laboratory Course	Wichmann	4	Passed	
German Language Course	Martin	5	Passed	

**These courses were completed as a prerequisite for admission to the Master's programme and are not included in the calculation of the overall grade.

MASTER'S THESIS	EXAMINER	CREDIT POINTS	GRADE	
"Characterization of Microreactors"	Agar	30	Very good	1.0

Overall grade: good (1.5)

ECTS grade: A

Credit points: 120

ADDITIONAL QUALIFICATIONS	EXAMINER	CREDIT POINTS	GRADE	
Numerical Solution of Differential Equations Separators	Turek	5	Satisfactory	3.3
Process Automation and Process Management		10	Satisfactory	3.1
Batch Process Operation	Krämer		Sufficient	3.7
Logic Control	Engell		Satisfactory	2.7

This module was not included when determining the overall grade.

Dortmund, September 30, 2012

The Chairman of the Examination Board at the Faculty
of Biochemical and Chemical Engineering

Prof. Dr.Ing. Rolf Wichmann