Faculty of
Science & Technology

UNIVERSITEIT TWENTE.

Programme-specific appendix to the programme part of the students' charter, including the education and examination regulations Chemical Engineering (ChE) Master's Programme

(art. 7.13 and 7.59 WHW)

Contents

Preamble

a. The rules in this appendix apply to the full-time master's programme Chemical Engineering (No. 60437).

b. Together with the Common Part and the rules of the master's Board of Examiners, this programme-specific appendix forms the programme section of the student charter for the master's programme Chemical Engineering of the faculty Science and Technology at the University of Twente.

c. The programme is subject to the legislation of the Dutch Higher Education and Research Act (WHW).

d. In conflicting situations, the Dutch text takes precedence over the English text.

Reference: TNW17055/bb/ae/vdh
Date: 20 July 2017

Article 1 Programme Mission and Objective

The Chemical Engineering master's programme aims to train students at an internationally recognized high academic master level, to be pro-active and enterprising researchers, designers and engineers who are able to develop, propagate and apply innovative knowledge in one of two fields: "Molecular and Materials Engineering" or "Chemical and Process Engineering".

The objectives of the master's programme in Chemical Engineering are the development of knowledge, skills and insight into chemical technology up to a final level at which graduates have sufficient competencies to act independently at a high academic level in the field of chemical technology and related disciplines. Graduates will be able to successfully enter a variety of professional fields, such as scientific research, process and product development, and professional training in the disciplines Chemistry, Materials Science and Process Technology.

Article 2 Programme Aims

The programme aims have been outlined on the basis of the 3TU Academic Competencies, better known as the Meijers Criteria (or the ACQA[1] criteria). These criteria have been approved by the NVAO[2] and these criteria provide a very good framework in which the general targets of an academic master's programme are systematically arranged and which also allow the inclusion of specific aspects of the programme.

A technical academic graduate is characterized by means of seven areas of competence (see Fig. 1), arranged into three groups:

(a) domain of the programme (1, 2, 3)
(b) academic method of thinking and acting (4, 5, 6)
(c) context in which scientific research is conducted (7)

Each area of competence consists of a combination of knowledge, skills and attitude.

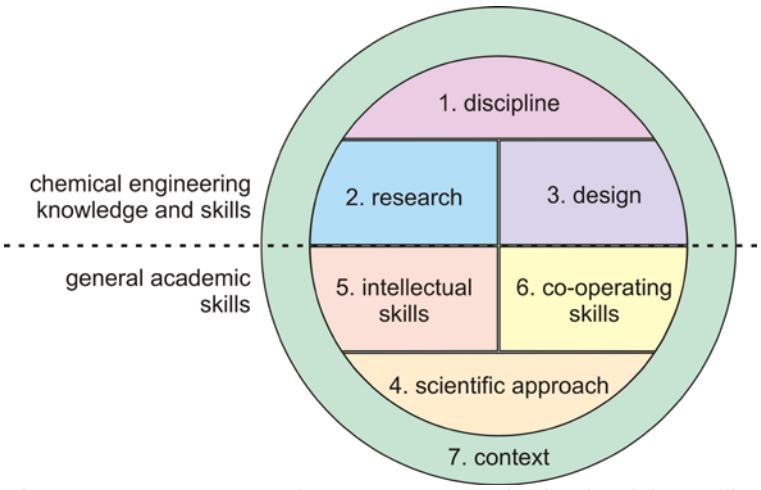

Figure 1. Seven areas of competence on the basis of the Meijers Criteria.

The graduate:

1. has knowledge of one or more scientific disciplines.
2. is a skilled researcher.
3. is a competent designer.
4. uses a scientific approach.
5. has basic intellectual skills.
6. is an able collaborator and communicator.
7. takes the current and social context into account.

Below, these seven areas of competence for a general technical academic master are further elaborated on to define the programme aims for the MSc Chemical Engineering. With each programme aim, the focus is on knowledge (k), skills (s) or attitude (a).

[1] ACQA: Academic Competences and Quality Assurance.

[2] Accreditation Organization of the Netherlands and Flanders (NVAO).

The Chemical Engineering graduate:

1. Has thorough knowledge of a sub-area of chemical technology.

An M-CHE graduate is versed in current scientific knowledge and has the competence to extend this knowledge by means of (independent) study.

1a	Understands the basic knowledge of the relevant disciplines and is versed in the areas of these disciplines that are in the forefront of the knowledge of chemical technology and underlying disciplines, such as (Bio-) Nanotechnology, (Biomedical) Materials Science and Process Technology (latest theories, methods, techniques and topical questions). [ks]
1b	Actively looks for structure and connections in the relevant disciplines. [ksa]
1c	Has the knowledge, skills and attitude to independently, in the context of more advanced ideas or applications in chemical technology, to: - develop theories and models, - interpret texts, problems, data and results, - conduct experiments, and collect and simulate data, - make decisions based on the data and the modelling. [ksa]
1d	Has experimental skills in areas of relevant disciplines, such as - chemistry and materials science: synthesis, qualitative and quantitative characterization of the properties of chemical substances. - process technology: synthesis, qualitative and quantitative characterization of the properties of chemical substances. [ksa]
1e.	Has the ICT skill to create and edit text, data and models. [ksa]
1f.	Is aware of the presuppositions of standard methods and their importance; is able to reflect on these methods and presuppositions; is able to challenge them; is able to propose changes and is able to assess their impact. [ksa]
1g.	Is able to independently identify gaps in their knowledge, and to enhance and extend their knowledge through study. [ksa]

2. Is capable of conducting research in a sub-area of chemical technology.

An M-CHE graduate has the competence to acquire new scientific knowledge through research. Research here means: developing knowledge and new insights in a targeted and methodical manner.

2a.	Is aware of the complex nature of the research methodology in chemical technology. [ksa]
2b.	Is able to independently conduct research at master level, and to - analyse research issues of a complex nature in chemical technology, - make use of the relevant knowledge base, - define research targets and, if relevant, define suitable hypotheses, - define a research plan, including the required theoretical and experimental steps, assumptions and methods, - carry out the various activities of the research plan, - analyse and evaluate the research results in relation to the defined problem, - asses the scientific value of the research results, - defend these results against others. [ksa]
2c.	Is perceptive and has the creativity and the ability to discover specific connections and new viewpoints and to use these new viewpoints for new applications. [ksa]
2d.	Is able to work at different levels of abstraction and selects the appropriate level for the process stage of the research problem. [ksa]
2e.	Is able to assess the scientific merit or research in chemical technology, to systematically collect such research, and to analyse and process it. [ksa]
2f.	Is able to and has the attitude to involve other disciplines in their research as and when necessary. [ksa]
2g.	Is able to handle changeability of the research process due to external circumstances or progressive insights. Is able to adjust this process accordingly. [ksa]
2h.	Is able to contribute independently to the development of scientific knowledge of one or more sub-areas of chemical technology. [ks]

3. Some have skills in process design in a sub-area of chemical technology.

In addition to carrying out scientific research, some graduates will also have acquired skills in process design. This is an important component, in particular in Chemical and Process Engineering (CPE). Designing is a synthetic activity that aims at the realization of new or changed artefacts or systems, with the objective of creating value in conformity with pre-defined requirements and wishes (with respect to safety, the economy, the environment).

3a.	Is aware of complex design methodology in the field of chemical technology, and of the fact that design is a cyclical process. [ksa].
3b.	Is able to independently design at master level, and to: - analyse complex design problems in connection with products and processes in the area of chemical technology, - integrate the relevant knowledge base in a design, - formulate design requirements, objectives and conditions, and takes into account safety, environmental and economic aspects, and describes and translates these requirements into quantitative design parameters, - formulate a design plan on a general and detailed level, including the steps, assumptions and methods, - carry out the various steps of a design plan, - analyse and evaluate a design and decision steps in a systematic manner with respect to the defined requirements, - making a technical and economic analysis of the selected design, - defend these results against others. [ksa]
3c.	Is able to play an active role in production innovation processes. [ksa]
3d.	Is able to systematically collect, analyse and process relevant design information from literature, patents, databases and websites, and is able to identify missing information. [ks]
3e.	Is creative and has synthetic skills with respect to design problems. [ksa]
3f.	Is able to work at different levels of abstraction and selects the appropriate level for the process stage of the design problem. [ksa]
3g.	Is able to handle changeability of the design process due to external circumstances or progressive insights. Is able to adjust this process accordingly. [ksa]
3h.	Is able to and has the attitude to involve other disciplines in their design as and when necessary. [ksa]
3i.	Is able to phrase new research questions on the basis of a design problem. [ks]

4. Takes a scientific approach.

An M-CHE graduate uses a systematic approach, characterized by the development and use of theories, models and consistent interpretations; has a critical attitude and has insight into the nature of chemical science and technology.

4a.	Is able to identify and take in relevant developments. [ksa]
4b.	Uses a systematic approach, characterized by the development and use of theories, models and consistent interpretations and is able to subject these to a critical assessment in the area of their final master's assignment. [ksa]
4c.	Is in possession of extensive skills in using, developing and validating models; is able to make a considered choice between modelling methods. [ksa]
4d.	Has insight into the nature of science and technology (purpose, methods, differences and similarities between scientific disciplines, nature of laws, theories, explanations, role of the experiment, objectivity, etc.) and is familiar with current discussions. [k]
4e.	Has insight into scientific practice (research system, relationship with clients, publications system, importance of integrity, etc.) and is familiar with current discussions on the subject. [k]
4f.	Is able to adequately document the research results and design, with the purpose to contribute to the development of knowledge within and outside the discipline, and is able to publish the results. [ksa]

5. Has intellectual skills.

An M-CHE graduate is competent in reasoning, reflecting and forming an opinion. These are skills that are trained and improved in the context of chemical technology, and that are generally applicable, afterwards.

5a.	Is able to critically and independently reflect on his/her own thinking, decision making, and acting and is able to make adjustments. [ksa]
5b.	Can reflect on the their strong and weak points in connection with research, design, organization and teaching/advising activities, and can make adjustments on the basis of this. [ks]
5c.	Is able to reason logically within chemical technology and is able to recognize modes of reasoning (induction, deduction, analogy, etc.); is able to recognize fallacies, and is able to apply these modes of reasoning. [ksa]
5d.	Is able to ask adequate questions and takes a critical, but constructive attitude when analysing and resolving complex problems in chemical technology. [ks]
5e.	Is able to achieve a substantiated opinion in case of incomplete of irrelevant data or inaccuracies, taking into consideration the manner in which the data was created. [ks]
5f.	Is able to express a point of view in a scientific argument in chemical science and technology and is able to make a critical judgement. [ksa]

6. Is an able collaborator and communicator.

An M-CHE graduate has the ability to collaborate with and work for others. This calls for adequate interaction, a sense of responsibility, as well as good communication with colleagues, non-colleagues. He/she is also able to participate in a scientific or public debate in the English language.

6a.	Is able to communicate in written and spoken English on research and solutions for problems with colleagues, non-colleagues and other stakeholders. [ksa]
6b.	Is able to understand written scientific literature and text books, discussions and debates in the English language. [ksa]
6c.	Characterized by professional behaviour. This means: drive, reliability, honesty, involvement, accuracy, perseverance and independence as well as respecting others, irrespective of their age, social or economic status, education, culture, beliefs, gender, race or sexual orientation. [ksa]
6d.	Is able to perform project-based work: is pragmatic and has a sense of responsibility; is able to deal with limited sources; is able to deal with risks; is able to compromise. [ksa]
6e.	Is able to work within an interdisciplinary team with a high level of diversity. [ks]
6f.	Has insight in and can handle team roles and social dynamics and is able to take on the role of team leader. [ks]

7. Takes the current and social context into account.

Chemical science and technology, materials science and process technology do not exist in isolation; they exist in a current and social context. Points of view and methods have their origin in society and, in time, decisions made will have consequences for society. An M-CHE graduate is aware of this and has the competence to integrate these insights in their scientific work.

7a.	Is aware of social, environmental, sustainability and safety aspects of chemical and related industries. [kv]
7b.	Has an eye for the various roles of professionals in society: researcher, designer, manager, adviser/teacher, and selects his/her own position. [ksa]
7c.	Is able to analyse the position of chemical technology in society and is able to analyse and discuss the social consequences (economic, social, cultural) of new developments in that area, to discuss the subject with colleagues, non-colleagues, and to integrate the consequences in his/her scientific work. [ksa]
7d.	Is able to analyse the ethical and normative aspects of the consequences and the assumptions of scientific thought and actions within chemical technology, to discuss the subject with colleagues, non-colleagues (in research, design and applications), and to integrate this in his/her scientific work. [ksa]
7e.	Is familiar with and has experience with the organization and the technological processes of a business in chemical technology. [ksa]

Article 3 Admission to the Programme

1. Direct admission to the programme is granted after:
   a. A degree in one of the bachelor's programmes in Chemical Engineering at a Dutch university, or
   b. proof of admission to the programme, issued by the admission board.

2. During assessment of the application for admission to the master's programme, the admission board can demand that some subjects must be passed before the proof of admission to the master's programme can be issued.

3. When a proof of admission to the master's programme is issued, the admission board may decide to grant exemption for particular parts of the programme, with exception of the final master's assignment.

4. A proof of admission to the master's programme granted by the admission board may be subject to the condition of a particular content of the student's master's programme and the admission may be limited to a particular track.

5. The decisions of the admission board in sections 3 and 4 of this article require the approval of the Board of Examiners.

6. The following applies for students with a qualification in higher professional education (HBO) in Chemistry or Chemical Technology:
   a. They can be admitted to a transfer programme of at least 24 EC.
   b. If the admission board identifies serious gaps in the student's previous education, additional requirements may apply on top of the transfer programme, but the total of the transfer programme and the additional requirements must not exceed 30 EC. After completion of the transfer programme, the students may be admitted to the master's programme.

   The transfer programme selected for the student by the Board of Examiners and the master's programme for students with a qualification in higher professional education (HBO) in Chemistry or Chemical Technology are defined in Article 6 of this programme-specific appendix.

7. Subject to specific conditions, master students of foreign universities who have reached an advanced stage of their master's programme may be admitted to the Condensed Master Programme of the Chemical Engineering master's programme (Article 7 of the programme-specific appendix)[3].
   a. The Condensed Master Programme consists of at least 75 EC.
   b. Only students who have been granted an exemption for 45 EC by the Board of Examiners of the Chemical Engineering master's programme are admitted to this programme.
   c. Students are only admitted to the Condensed Master Programme if the student's specific programme, including the exemptions to be granted, is approved by the Board of Examiners of the Chemical Engineering master's programme.

8. Subject to conditions, students with a relevant bachelor's degree may be admitted to the Erasmus Mundus Master Membrane Engineering programme (EM3E). This programme is defined in Article 8 of this programme-specific appendix.

9. Students in possession of a degree of the bachelor's programme Chemical Engineering of the University of Twente and in possession of a second-degree teaching qualification in Chemistry after successfully completing the minor Learning to Teach (2 x 15 EC), may be admitted to the 'Master's programme with first-degree teaching qualification'. This programme is defined in Article 9 of this programme-specific appendix. After successful completion of this programme, the student will receive the master qualification Chemical Engineering with a statement that he/she has a first-degree teaching qualification in Chemistry.

10. Students with a qualification in a technical subject or physics and a job in the business world, can be admitted to the ‘PT course’ programme. This programme is defined in Article 10 of this programme-specific appendix. After successful completion of additional subjects, students who have successfully completed the courses PT-I, PT-II and PT-III, can be admitted to the master's exam of the programme. The procedure for admission to the master's exam for students in possession of the certificates PT-I, PT-II and PT-III is defined in Article 11 of this programme-specific appendix.

11. Students in possession of a degree for the bachelor's programme Advanced Technology may be admitted to the regular master's programme if their bachelor's programme meets the conditions specified in Article 12 of this programme-specific appendix. The contexts of the transfer programme attended by the student

[3] An agreement to this end (the ‘double degree’) has been entered into with the Institute of Technology of Bandung (ITB).

will determine whether the student is admitted to the track Molecular and Materials Engineering (MME) or to the track Chemical and Process Engineering (CPE).

12. Students with a previous education at a foreign institution must demonstrably have sufficient language skills in spoken and written English. A requirement for their admittance to the programme may be a sufficient score in a recognized test. This means a total score of 6.5 or higher for the IELTS test, or a score of 90 or higher for the Internet-based TOEFL test[4]. Students in possession of a bachelor's degree from a country where English is the main language in higher education[5] are exempt from this requirement.

Article 4 Admission Board

1. An admission board is appointed by the dean of the faculty of TNW for the admission to the master's programme of students who are not directly admitted in conformity with Article 3, section 1a.

2. The Executive Board has delegated the authority to accept or reject students (S&C/387.191/lk) to the board mentioned under section 1.

3. The admission board consists of at least two members, including:
   a. the Programme Director;
   b. in case of foreign students, the professor of the chair in which the student wants to graduate, and the Internationalization Coordinator;
   c. in case of students with a qualification in higher professional education, the higher professional education coordinator;

   The admission board is chaired by the Programme Director.
   If the chair deems it necessary, the secretary of the Board of examiners and/or the study advisor can join the admission board.

4 IELTS: International English Language Testing System; TOEFL: Testing of English as a Foreign Language; see the UT website on admittance to the master's programme's: https://www.utwente.nl/en/education/master/admission-requirements/international-degree

5 The list of countries can be found at https://www.utwente.nl/en/education/master/admission-requirements/international-degree/countries/.

Article 5 Regular Master's Programme

The Chemical Engineering master's programme has two regular specializations ('tracks'):

1. Molecular and Materials Engineering (MME),
2. Chemical and Process Engineering (CPE).

The programme has the following structure:

1. 35 or 40 EC compulsory subjects for the MME and CPE track respectively, as specified in the following table.

Compulsory subjects MME track			**Compulsory subjects CPE track**		
Code	*Name*	*EC*	*Code*	*Name*	*EC*
193700030	AMM Organic materials science	5	201600151	Advanced chemical reaction engineering	5
193700010	AMM Characterization	5	201300049	Advanced molecular separations	5
193700040	AMM Inorganic materials science	5	201600153	Lab course Sustainable Process Technology	5
193700020	AMM Molecular and biomolecular chemistry and technology	5	201500166	Process Intensification Principles	5
193700050	AMM Project Organic materials	5	201600152	Advanced Catalysis	5
193700070	AMM Project Inorganic materials and molecular science and technology	5	201300045	Process plant design incl. thermodynamics and flow sheeting	15
	1 elective of a list of non-technical subjects (which can be found on the website www.utwente.nl/che)	5			
	Total	35		Total	40

2. 10 EC in electives in line with the chair and/or the Twente Graduate School (TGS);
3. other electives (also non-technical subjects) to make the total scope of the programme add up to at least 120 EC;
4. an Internship & Job Orientation Project of 20 EC with an external business or institution;
5. a final master's assignment of 45 EC in the selected track.

The Contract Research Assignment for the trip to a foreign country can be registered as Capita Selecta of a group (elective) or as a separate elective 193799700 CR Study Tour Assignment.

The final master's assignment is assessed with two grades:

- One for conducting the chemical-technical research (201300054, 25EC). The chemical-technical research consists of the problem analyses (familiarizing oneself with a particular field of study, recognizing problems and formulating the research questions and approach), the realization (the theoretical and experimental approach and realization), and the results analysis (analysis of the results and their relevance);
- One for the general aspect of the reporting (201300055, 20 EC). The general aspects consist of independence, involvement, collaboration, originality and creativity. Reporting consists of the oral reporting (presentation and discussion of the research) and the written report (the final master's assignment report).

Approval of the final master's assignment by the Board of Examiners must be requested in time by means of the form 'MSc assignment contract and course list Chemical Engineering' (no later than 1 month before the start of the assignment). The final master's assignment must be of a chemistry-technical nature. If the assignment is not carried out with a research group that is represented in the discipline committee Chemical Engineering, the student must indicate the chemistry-technical aspects of the assignment in the proposal.

The combination of subjects requires the approval of the supervising professor and the Board of Examiners.

If a student already successfully passed one or more compulsory subjects of the master's programme during his/her bachelor's programme, the student may be granted exemption for those subjects. In that case, the total number of EC for the master's programme will be reduced for the student.

Article 6 Programme for students with a qualification in higher professional education

1. The transfer programme is as follows:

Transfer programme MME track		**Transfer programme CPE track**	
Name	*EC*	*Name*	*EC*
Calculus A	5	Calculus A	5
Calculus B	3	Calculus B	3
Programming in Engineering	3	Programming in Engineering	5
Catalysis and reaction kinetics[1]	4,5	Catalysis and reaction kinetics[1]	4,5
Industrial chemistry and processes[1]	4,5	Introduction Chemical Reaction Engineering[4]	4
Advanced materials science[2]	5	Fluid dynamics, heat and mass transfer[3]	7,5
Chemistry and technology of inorganic materials[2]	5		
Total	30	*Total*	29

[1] Part of module 5 of the B-ST.
[2] Part of module 6 of the B-AT.
[3] Part of module 6 of the B-ST.
[4] Part of module 8a of the B-ST.

The transfer programme of the MME programme is given during the first semester. The transfer programme of CPE is given during 1 year.

2. Students must complete the transfer programme within a period of 1 year and will be given 2 opportunities to take the exam.
3. After completion of the transfer programme, if the student is in possession of a qualification in higher professional education in Chemical Technology, he/she will be admitted to the Chemical Engineering master's programme. He/she will be admitted for the track in which they attended the transfer programme.
4. Instead of the transfer programme mentioned above, students of the University of Applied Sciences can also attend a transfer minor of 30 EC (Kies-Op-Maat minor) during their higher professional education.

   The programme of the transfer minor is:

Transfer programme MME track		**Transfer programme CPE track**	
Name	*EC*	*Name*	*EC*
Calculus A	5	Calculus A	5
Calculus B	3	Calculus B	3
Programming in Engineering	3	Programming in Engineering	3
Catalysis and reaction kinetics[1]	4,5	Catalysis and reaction kinetics[1]	4,5
Industrial chemistry and processes[1]	4,5	Introduction to Chemical Reaction Engineering	3
Advanced materials science[2]	5	Fluid dynamics, heat and mass transfer[3]	7.5
Chemistry and technology of inorganic materials[2]	5	Numerical methods	4
Total	30	*Total*	30

[1] Part of module 5 of the B-ST.
[2] Part of module 6 of the B-AT.
[3] Part of module 6 of the B-ST.

Article 7 Condensed Master Programme

A student's specific programme, including any exemptions to be granted, must be approved in advance by the Board of Examiners of the Chemical Engineering master's programme. The following rules apply:

1. The Condensed Master Programme consists of at least 75 EC: 30 EC subjects and 45 EC for the final master's assignment.
2. Student admitted to the Condensed Master Programme may be granted exemption for some of the compulsory subjects of the MME track.
3. At least 5 EC in optional subjects must be included in the programme. At least one of these subjects must be selected in consultation with the supervising professor as a preparation for the final master's assignment.

This is an overview of the Condensed Master Programme:

Compulsory courses MME track		
Code	Name	EC
193700040	AMM Inorganic materials science	5
193775020	AMM Physical organic chemistry	5
	1 elective of a list of non-technical subjects	5
	Sub total	15
Advanced Materials Science Project		
193700050 193700070	AMM Project Organic materials science AMM Project inorganic materials science and molecular science and technology	10
	Sub total	10
	Elective courses	≥ 5
	Internship & Job Orientation Project: optional	
	Master assignment	45
	Total	≥ 75

Article 8 Erasmus Mundus Membrane Engineering programme

The Erasmus Mundus Membrane Engineering programme (EM3E) is a common master's programme in the field of membrane technology, at the intersection of Materials Science and Process Technology.
It is offered by six universities in five countries, including the University of Twente.
The EM3E programme can be regarded as a specialization within the departments that deal with membrane technology.
The programme consists of four semesters of 30 EC. Participating students will visit three different universities in three countries.[6]

For students admitted to the programme who follow part of their education at the University of Twente, the programme is as follows:

Semester	Unit	Responsible university	EC
Semester 1	of Fundamentals of chemical engineering	UPS France	30
	of Fundamentals of materials science	UM2 France	
Semester 2	Fundamentals of technologies and modelling	ICTP Czech Republic	30
Semester 3	Energy and Environment	University of Twente	30
Semester 4	Master thesis	University of Twente	30

The final master's assignment will be carried out at one of the following departments:

- Inorganic membranes;
- Soft matter, fluidics and interfaces;
- Membrane science and technology.

After successful completion of this programme, the student will receive a multiple master's degree in Chemical Engineering: One from each university where the student has studied for one semester.

6 More information is available at http://www.em3e.eu/

Article 9 Master's programme with first-degree teaching qualification

The structure of the master's programme with a 30 EC educational component is as follows:

1. Compulsory subjects (35 (MME) or 40 (CPE) EC) as stated in Article 5, section 1.
2. 15 EC educational (design) subjects;
3. a number of other optional subjects (also non-technical subjects) to make the total scope of the programme add up to at least 120 EC;
4. an educational internship of 15 EC;
5. a final master's assignment of 45 EC in the selected track.

The provisions for the Contract Research Assignment and the final master's assignment as well as the other provisions for all tracks in Article 5, also apply to this master's programme.

After successful completion of this programme, the student will receive the master qualification Chemical Engineering with a statement that he/she has a first-degree teaching qualification in Chemistry.

Article 10 'PT course' Programme

The faculty offers a Process Technology (PT) course. This course is intended for people with an educational background in technology or physics, working in the business world, and seeking to acquire further knowledge of Process Technology. The course is also suitable for professional development, continuing education or retraining of engineers (*ir., ing.*) and chemists (*drs., dr.*).

The course consists of three parts: PT-I, PT-II and PT-III. PT-I consists of six parts made up of modules from the Chemical Engineering bachelor's programme. Knowledge of these subjects is required for the compulsory subjects of the MSc track Chemical Process Engineering, some of which are part of PT-II. PT-II consists of a number of compulsory subjects from the CPE track. PT-III consists of one compulsory subject, two optional subjects, and an individual design assignment. The optional subject can be used to extend knowledge, or as the required basis for the individual assignment.

The individual design assignment is carried out at the company where the participant is employed, and is completed by a written report. Supervision and assessment will be carried out by one of the lecturers of the Chemical Process Engineering master's programme. Before starting, an abstract must be sent to the course coordinator, and the assignment must be approved by the company and by the supervising lecturer.

This is an overview of the programme for PT-I, PT-II and PT-III:

PT-I	*Parts made up of modules from BSc Chemical Engineering*	
Code		EC
201500201 201500203	Chemical equilibrium Phase diagrams	3 2
201100207	Introduction to separation methods, excl. practical course	4
201500215	Introduction to Chemical Reactor Engineering	4
201500206	Catalysis and Reaction Kinetics	4.5
201500209	Fluid Dynamics	3
201500210	Heat and Mass Transfer	4.5
	Subtotal	**25**

PT-II	*Compulsory subjects MSc Chemical Engineering (CPE track)*	
Code		EC
201600151	Advanced Chemical reaction engineering	5
201300049	Advanced Molecular Separations	5
201600152	Advanced Catalysis	5
201500166	Process Intensification Principles	5
	Optional subject	5
	Subtotal	**25**

PT-III	*Design*	
193735010	Thermodynamics and flowsheeting	5
193799600	Individual assignment (incl. design)	15
	2 optional subjects from the list of optional subjects of the CPE track	10
	Subtotal	**30**

Total	**80**

Article 11 Final Master's Exam Procedure for PT students

1. Candidates in possession of certificates I, II and III, who have successfully completed the course Process Technology and the parts Thermodynamics and Flowsheeting, and Individual Assignment (incl. design), can submit a written request to the secretary of the Board of Examiners for admission to the Chemical Engineering master's programme. This request must be accompanied by a CV and a detailed overview of their education and relevant work experience.

2. If the Board of Examiners honours the request mentioned in the previous section, the candidate is admitted to the Engineering master's programme and is granted exemption for all parts of the master's exam, except the final master's assignment.
3. Instead of the regular master's programme, the student will carry out a Final Company Assignment of 45 EC. This consists of a written and oral report on a part of the activities within the company where the candidate is employed. This report must demonstrate that the work is carried out at an academic level. The scope of the work must be comparable to the final master's assignment of a master student in the regular track of Chemical Process Engineering and must contain research and/or design aspects.
4. The Board of Examiners will assign a master assignment committee for the assessment of the Final Company Assignment, as outlined in Article 13 of the rules of the Chemical Engineering Board of Examiners.
5. The master assignment committee will assess whether a student has conducted a chemistry-technical research or created a chemistry-technical design of sufficient scientific merit, and meets the programme targets that also apply to the final master's assignment of the regular master's programme.
6. If the Final Company Assignment is completed with a sufficient grade, the student meets the requirements for the master's exam defined by the Board of Examiners of the Chemical Engineering master's programme.

Article 12 Admission Requirements for BSc Students Advanced Technology (AT)

Depending on the selected track, a BSc student AT must attend a programme for admission to the MSc Chemical Engineering.

For the MME track:

- Materials Science and Engineering (M6 of the B-AT, 201500058, block 1B, language: English) or Materials Science & Technology (M8b of B-ST, 201600135, block 2B, language: Dutch)
- Molecules and Materials (M7 of B-ST, 201500099, block 2A, language: Dutch)

For the CPE track:

- Physical Chemistry (part of M6 of the B-AT, block 1B, language: English)
- Basics for Process Design (201500151, 3 EC, 1A, language: Dutch)
- Transport Phenomena module (M6 van the B-ST, 201400162, block 1B, language: Dutch)
- Process Design module (M8 of the B-ST, 201400164, block 2B, language: Dutch)

Article 13 Transition Regulation

1. In the event of a change to the programme included in the Articles 5 to 10 and 12 of this appendix, or of a change to one of the other articles included in the general part of this programme-specific appendix, a transition regulation will be defined and announced by the Programme Director.
2. Article 8.4 of the general part states the conditions to be met by a transition regulation.
3. The transition regulation will be published on the website of the Chemical Engineering department.

Article 14 Safety

Working in a laboratory is subject to safety requirements. Students must acquaint themselves with these rules[7] and abide by them.

Article 15 Sequence of Study Units

1. Prior to starting a programme unit, the student must meet the knowledge requirements of the programme unit.
2. The student can only start the Internship & Job Orientation Project when he/she has successfully completed at least 30 EC of the master's programme.
3. The student can only start the final master's assignment when he/she has successfully completed at least 65 EC of the master's programme (including the Internship & Job Orientation Project).
4. Prior to the examination on the final master's assignment, the student must have successfully completed all other programme units.
5. The Board of Examiners is authorized to grant exemption from the conditions in sections 1 to 4 of this article if strict application of those terms would result in an unreasonable delay in study progress. The student can submit a request to this end to the Board of Examiners.

Article 16 Free Programme

Contrary to the provisions in articles 5 to 10 and 12 of this appendix, the student can request the permission of the Board of Examiners to attend a free programme in the sense of Art. 7.3d of the legislation. The Board of Examiners will assess whether the programme is suitable within the domain of the department, is consistent, and has sufficient merit in terms of the final education targets of the department.

Article 17 Student Counselling

The task of the study advisor is to individually advise students on all aspects of their studies, and to inform the Programme Director on the study progress of the students.

Article 18 Quality assurance and evaluation

1. The programme management is responsible for the evaluation of the programme.
2. The execution of the evaluation of the education of the master's programme takes place using PDCA procedures by the coordinator Quality Assurance of the Science & Technology faculty/Science & Technology cluster and the programme director/ programme coordinator.
3. The following evaluation tools are used:
    a. Panel meetings with students;
    b. Web surveys of the master's courses[8];
    c. Web survey of the master's final project.
4. The results of the internal quality assurance activities will be published in the following manner:
    a. Summary of the web surveys and response of the lecturer regarding the evaluation will be sent to the programme committee;
    b. Summary of web surveys and the response of the lecturer will be placed in the Blackboard organization 'Kwaliteitszorg en evaluatie ST (Quality Assurance and Evaluation Chemical Engineering)' which is accessible for all students and lecturers of programme.
5. To evaluate the curriculum and the master's programme in its entirety the following internal and external evaluations are used:
    a. All information obtained using the tools which are mentioned in 18.3;
    b. The National Student Survey (NSE)[9];
    c. The National Alumni Survey (NAE)[10].

    The programme management will respond to the evaluations, and provide a written reaction focusing on plans for improvement.

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7 See the rules on occupational health and safety and the environment, at http://www.tnw.utwente.nl/intra/diensten/amh/ .

8 Not all courses are evaluated using a web survey every year.

9 The NSE is taken every year.

10 The NAE is taken every two years.

6. The programme management and the programme committee decide on which actions need to been taken on course level or curriculum level in order to improve the programme. These actions will be recorded in an ‘Action List Quality Assurance and Evaluation'.
7. Every year the programme management writes an improvement plan, based on the internal and external evaluations and new insights.
    a. The improvement plan will be discussed with the programme committee;
    b. The improvement plan will be included in the faculty’s annual report;
    c. The faculty’s annual report will be discussed with the university’s executive board by the dean of the faculty and the portfolio holder education during the autumn meetings.

Article 19 Effectuation and Changes

These regulations will come into effect on 1 September 2017 and replace the regulations dated 1 September 2016.

Established by the Dean of the Faculty, after advice from the Faculty Council and the Programme Committee.

Enschede, 20 July 2017.