

Syllabus

MSc Chemical Engineering (M-CHE)

MME Track

2018 / 2019 (version October 2018)

*Please note that even though the information in this syllabus is gathered with the utmost care, you cannot derive any rights from this syllabus. At the moment of composing this syllabus not all course descriptions were available. **Please check Osiris regular for the most up-to-date information.**

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GENERAL INFORMATION

BLOK STRUCTURE

The MSc Chemical Engineering programme is a 2-year programme (120 EC). As all other BSc and MSc programmes at the University of Twente the year starts in September and ends at the beginning of July. Each year is divided into 4 blocks, which are referred to as 1A, 1B, 2A and 2B.

Block		Weeks	Dates
Block 1A	Instruction weeks	36 – 43	Sept 3 – Oct 23
	Exam weeks	44 – 45	Oct 29 – Nov 9
Block 1B	Instruction weeks	46 – 3	Nov 12 – Jan 18
	Exam weeks	4 – 5	Jan 21 – Feb 1
Block 2A	Instruction weeks	6 – 14	Feb 4 – Apr 5
	Exam weeks	15 – 16	Apr 8 – Apr 19
Block 2B	Instruction weeks	17 – 25	Apr 22 – Jun 21
	Exam weeks	26 – 27	Jun 24 – Jul 5

NOTE: Blocks are sometimes referred to as quarters, which were numbered 1 to 4.

With a total of 120 EC over 2 years, each block is equivalent to 15 EC, which is roughly equivalent to 3 courses (as most courses are 5 EC). 1 EC is equivalent to 28 hours of study, making 1680 hours per year.

For a typical course having a load of 5 EC, this means 140 hours study load on average. This includes lectures, tutorials, project work, report, assignments, self-study and examination.

All courses of the MSc Chemical Engineering are provided in the English language.

COURSE SCHEDULES

The course schedule ('rooster' in Dutch) is providing detailed information on the location and times, where and when lectures, tutorials, assignments, etc. related to specific courses are given. These schedules also contain information on examinations, re-sit opportunities and closing dates for exam registration.

For up-to-date schedules for each educational activity at the University, go to: <https://rooster.utwente.nl>

Here you can create your personal schedule based on the courses/programmes you select. If you use the log-in feature, this page saves your schedule. It is also possible to integrate the schedule into your personal digital agenda (for more information, please consult the help-pages on the website).

LECTURE TIMES

Lecture times are indicated with numbers from 1 to 9. Most lectures are scheduled as double-hours, meaning 1-2, 3-4, 6-7 and 8-9. Number 5 is the lunch break. These numbers refer to the following times:

Number	Time
1	8.45 – 9.30 hrs
2	9.45 – 10.30 hrs
3	10.45 – 11.30 hrs
4	11.45 – 12.30 hrs
5	12.45 – 13.40 hrs

Number	Time
6	13.45 – 14.30 hrs
7	14.45 – 15.30 hrs
8	15.45 – 16.30 hrs
9	16.45 – 17.30 hrs

LOCATIONS

The location where a lecture, tutorial, or exam is given is mentioned in the schedule using different 2-letter codes. The number following right after the code is the room number within that building, the first number in most cases referring to the floor.

Code	Building	Code	Buiding	Code	Building
CU	Cubicus	VR	Vrijhof	HT	Horsttoren
HO	Hogekamp	WA	Waaier	NH	Noordhorst
RA	Ravelijn	ZI	Zilverling	OH	Oosthorst
SP	Spiegel	CR	Carré	WH	Westhorst
SC	Sportcentrum	NA	Nanolab	ZH	Zuidhorst
TE	Temp	HR	Horstring	ME	Meander

STUDENT SERVICES

For questions related to the administrative part of your study, such as:

- switch to another study programme
- enrol in a second programme
- (temporarily) quitting your programme
- receive refunds of tuition fees
- get information on validity of (foreign) diplomas
- get information concerning student cards
- study card
- Osiris
- Bank account
- Accommodation
- Etc.

Please contact Student Services online at <https://www.utwente.nl/ces/studentervices/en/> or visit them in the Vrijhof.

Location: Vrijhof, room 239 B

Opening hrs: Mo – Fri 10.00 – 16.00 hrs

Tel: 053 - 489 2124

Email: studentservices@utwente.nl

STUDENT CARD

Upon enrolment as a student you will get the student card (Dutch: 'collegekaart'). This card is your ID-card to be used at the university and serves as proof of you being enrolled as a student. Have this card with you at all times. This card also works as access card for many of the campus facilities (such as Union Card and Student Union Activity Card).

In case you lose your card, please contact the Student Services immediately.



UNIVERSITY LIBRARY (UB)

The University of Twente has an extensive library. The library (also known as UB) has a large collection of books and magazines on a huge number of research areas. Depending on the information they are available on-line, hard copy, lendable or only-on-inspection.

Furthermore the library provides study facilities, such as desks in reading halls, private study rooms and small rooms for groups.

With a valid student card you can access the library and use all the services offered. For specific information on how to do that you can turn to the desks at the different library locations.

A lot of the services can be accessed through: www.utwente.nl/ub

Here you will find on-line catalogues, databases and search engines. A huge number of journals can be accessed via this website and allow you to download specific research papers.

The University library is located in the Vrijhof building. For precise opening hours, check the website.



IT SERVICES

Once registered as a student, you will receive a student account which consists of your unique student number, an email address and a password. This student number and password can be used for all the web applications of the University of Twente.

Web applications can be accessed through the Student Portal: <http://my.utwente.nl/ut/index.html>

ICTS SERVICEDESK - NOTEBOOK SERVICE CENTER

For information on discounts on notebooks, installation of software and hardware, repairs and other services related to notebooks and computers, you can consult the website (<https://www.utwente.nl/lisa/nsc/>) or visit the ICTS Servicedesk at the ground level in the Citadel building. The desk is opened from Monday to Friday between 8.30 and 17.00. You can also call at 053-489 5577 or email at servicedesk-ict@utwente.nl.

OSIRIS

REGISTRATION FOR COURSES AND EXAMS (OSIRIS)

For all courses you need to register through the Osiris-student website (<https://osiris.utwente.nl/student/StartPagina.do>). Use your personal codes (student number and email password) to logon to this web application.

You can register and deregister for exam from 40 to 14 days before the examination. Deregistration can be done up to and including the day before the examination. In case of problems, contact the BOZ-ChE (BOZ-CHE-CES@utwente.nl) office.

If you did NOT register for an exam, you are not allowed to take the exam.

The examination schedule may change after you have registered, e.g. an examination may be moved to a different location. Before the examination, consult the educational announcements, Canvas or the examination schedule available on Osiris for any changes.

NOTIFICATION AND AVAILABILITY OF EXAMINATION MARKS (OSIRIS)

Exams have to be corrected within 10 workdays after the exam date. Once the Educational Affairs Office (S&OA) has processed the grades, you can access your grades in Osiris (www.utwente.nl/osiris). Login with your personal codes (student number and email password). Examination results are confidential and are treated as such by BOZ.

ONLINE COURSE INFORMATION SYSTEM (OSIRIS)

For up-to-date course descriptions of all the courses offered at the University of Twente, you can use the online course-catalogue (part of Osiris). Also within this Master Guide you will find detailed information on the core modules and most elective modules that are considered relevant for the MSc Chemical Engineering. Information on courses however is subjected to changes. For the most up-to-date information on courses, and course content, please consult the online course-catalogue.

Osiris course-catalogue is accessible through <https://osiris.utwente.nl/student/OnderwijsCatalogus.do>

CANVAS

Canvas is the digital learning environment of the University of Twente. Its main functions are:

- (un)subscribing for courses.
- the course schedule
- submitting and receiving feedback of assignments
- information, such as hand-outs of the lectures, news, announcements and additional course material

Access to Canvas requires an internet connection and an account. You will get this with your registration as a student at the university.

Manuals for how to use Canvas can be found on the website. Canvas can be accessed via:

<http://canvas.utwente.nl/>

PROGRAMME RELATED INFORMATION

STAF CHEMICAL ENGINEERING



BEN BETLEM, PROGRAMME DIRECTOR CHEMICAL ENGINEERING

Within the Faculty each study programme has its own organisation with a programme director in charge. He bears the final responsibility for the educational quality of the study programme. This concerns the overall policies, regulations and performance in the programme, and also the daily management. The Programme Director constitutes the board of the study programme and plays an important role in the development of new courses but also in monitoring and improving the existing tracks and courses.

ALEXANDRA ELBERSEN, PROGRAMME COORDINATOR & STUDENT FOR ADVISER HBO & DUTCH STUDENTS

The Programme Coordinator supports the programme director and is in charge of the organizational, procedural and content-related coordination of the study programme. She coordinates the connection and the quality assurance of the educational programme. Together with the students, the mentors, and lecturers, she evaluates the courses and initiates necessary changes.



The student adviser can guide students during study problems they might encounter. Besides programme-related problems, students can talk about experiences with studying, planning, complaints, educational and examination regulations, legal position and possible other suggestions concerning the personal programme. The student adviser is the person of trust for students. Alexandra is the students adviser for Dutch students and students who did their bachelors at a University of Applied Sciences. **To make an appointment with the study adviser, please visit tnw.planner.utwente.nl. Here you can make your appointment with the study adviser.**



RIK AKSE, STUDENT ADVISER FOR INTERNATIONAL STUDENTS

The student adviser can guide students during study problems they might encounter. Besides programme-related problems, students can talk about experiences with studying, planning, complaints, educational and examination regulations, legal position and possible other suggestions concerning the personal programme. The student adviser is the person of trust for students.

Rik is the study adviser for all international students. **To make an appointment with the study adviser, please visit tnw.planner.utwente.nl. Here you can make your appointment with the study adviser.**

ANDRÉ TEN ELSHOF, TRACK ADVISER

The Track Adviser supports the programme director and the programme coordinator. He advises regarding the content of the specialization.



WEBSITE

All important information about the programme can also be found on the website of the programme:

www.utwente.nl/che

BUREAU OF EDUCATIONAL AFFAIRS (BOZ)

For all your affairs dealing with grades, courses, diplomas, etc., you will have to contact the BOZ-TNW office, of which the MSc Chemical Engineering is part. You can contact the BOZ-ChE office



Erna Brus

BOZ-ST-CES@utwente.nl

Buitenhorst 217/218

Working days: Monday – Thursday

STUDENT'S CHARTER (INCLUDING OER)

The Student's Charter is a legal document stating the **rights and responsibilities** of both the institution providing the education (University of Twente) and the student (that is you). It gives details of the service you can expect from us and what we can expect from you.

This document consists of 4 different parts. The first part is general for all students enrolled in any educational programme at the University of Twente. This part can be consulted on the web at:

<https://www.utwente.nl/en/ces/sacc/regulations/charter/>

More specifically to the MSc Chemical Engineering itself here are 3 other documents, which are referred to as the **Examination Regulations and Graduation Requirements** (the OER, "Opleidings en Examen Reglement"). These 3 documents describe the partnership between the organization (Faculty of Science and Technology, University of Twente) and its students in terms of the kind of performance that is expected of both those parties. This document outlines the rights and obligations of both parties within the educational process. Alongside of the commitment obligation on the part of the organization as described in this charter there is the commitment obligation of the student to satisfy all the requirements and gain the MSc degree Chemical Engineering within the allocated time. The English version of this document has been endorsed by the Faculty Council in which both the dean, and the students are represented. The rights that the student can appeal to on the grounds of this charter are granted to him in order to make such appealing possible. The charter has its legal foundations in Art. 7.59 of the Higher Education and Scientific Research Act (WHW).

The **Examination Regulation and Graduation Requirements** for the MSc Chemical Engineering comprises of:

- **General part**, a section that is applicable to all Master programmes within the faculty of Science and Technology
- **An ChE-specific appendix** to this first document, which pertains only to the Master Programme in Chemical Engineering
- **Rules of the Board of Examiners**

These 3 documents are available in English. Digital versions of these documents (in PDF) can be downloaded from: <http://www.utwente.nl/che>.

TRANSITION REGULATIONS

If the regulations are changed, the programme director will make a transition regulation and announce these regulations to all students. More information on this can be found in article 13 of the OER.

ABSENCE

When it is not possible to attend a compulsory practical course, tutorial or an exam, due to illness or circumstances beyond your control, this may have consequences. It is therefore essential to inform your lecturer or supervisor as soon as possible. When an exam is missed beyond the student's control and the student is severely disadvantaged by this, the Board of Examiners may decide to permit the student to take an extra exam at a later time. In this case, the Board of Examiners will consult the student adviser. (Nevertheless, a special treatment is not always required if it is generally possible to join the next exam session.)

A long-term illness or other personal circumstances may hinder your study progress. In this case, contact your mentor or student adviser.

In some exceptional cases of illness and circumstances (in your family) - or in a broader sense: situations beyond your control - you may be financially compensated by emergency funds, medical-social funds or university funds. For such cases, contact the information desk of student counsellors ("red desk" located at the Bastille), preferably after counselling the student adviser of your study programme.

More information: <https://www.utwente.nl/ces/sacc/>

EXAMINATION PROCEDURES

For most courses, a block (or semester) is concluded with an exam. For all courses there two opportunities to take an exam sessions per year: one directly following the block in which the lectures are given and one after the following block. Consult the schedules, Osiris or contact the lecturer for the precise dates of exams. When you take the same exam more than once, the highest grade applies. Grades/marks you receive for the courses are integer numbers ranging from 0 to 10, where 10 is the maximum. The only exception is a 5.5. Grades 5.5 or higher are a passing grade.

DURING THE EXAMINATION SESSION

During the examination, one supervisor is present that can clarify any issues during the exam. If requested by the supervisor, you have to identify yourself with a student card and you also have to follow their instructions.

During examinations, no contact with other students is allowed. It is expected that you prevent disturbance of fellow students and therefore be on time at the examination session. During the first half an hour after start of the examination session, late-comers will be allowed to participate, and after that time will be prevented from participating. Due to this rule, it is not legitimate to leave the exam within this first half hour. The examination session ends at the set time, also for late-comers. At the end of your exam, every paper that you hand in must include a name and student number. If present, the attendance list should be signed.

FRAUD

Please make sure that you are aware of the rules regarding fraud and the consequences of it.

It is **not allowed**:

- to use materials (e.g. books, electronic devices, notes) during a test which is not permitted by the examiner prior to the start of the test;
- to cheat during the test
 - o by the use of unauthorized material,
 - o by copying from others or allowing others to copy,
 - o by communicating about the test during the test with persons other than the invigilators.
 - o
- to plagiarize.

Consequences can be:

- not to be allowed to take one or more tests, examinations or final examinations for a certain period of time (determined by the Board of Examination) for a maximum of one year;
- or to be permanently expelled.

RIGHT OF INSPECTION AND APPRAISAL

During a period of at least 6 months after the results of a written examination have been

published, you have the right to inspect the assessed piece of work. When requested, you will be provided with a copy of the assessed piece of work and the examination criteria. You are furthermore entitled to an appraisal with the corresponding examiner. The appraisal will take place at a time and place determined by the examiner.

The examiner sees to it that written examinations are kept archived for at least two years after the examination date. In some cases, a lecturer organizes a general exam evaluation. It is recommended to make use of your right for inspection in case you did not pass your exam while you have put sufficient time in taking the course. In this way, you get a better idea of the course demands and of the gaps in your knowledge.

WORKSHOP ACADEMIC SKILLS

International students and students who finished their bachelor's degree at a University of Applied Sciences will have to follow the workshop Academic Skills. During this workshop students learn:

- how to search for literature at the University of Twente,
- how to write a report, and
- how to work in groups.

There will be 3-4 lectures students have to attend. This is an practical workshop, students are expected to participate during the workshops and to practice with the learned material.

INTERNSHIP & JOB ORIENTATION PROJECT

The Internship & Job Orientation Project (20 EC) is a compulsory part of the MSc programme Chemical Engineering. The experience in this period is a great help in orientation on the career with an academic MSc diploma. Students will do the Internship & Job Orientation Project in industry in the Netherlands or abroad, at another university outside the Netherlands or at another university/research institute.

Judgement whether the project foreseen is of sufficient quality has to be performed by an academic supervisor. During this assignment, gained knowledge and skills at the study programme can be applied in an actual working environment.

UT students who will do their Internship & Job Orientation Project have to register via the registration system Mobility Online (<https://www.utwente.nl/en/education/current-students/mobility-online/>).

International students should also contact Rik Akse (h.a.akse@utwente.nl) during the arrangement of the internship.

Every year in an information session, the coordinator provides general information about the internship. Also, take care that you will be authorized to visit the Canvas site **Internships TNW** (under courses). At this site, you find the internship guide, information about experiences in the past, internship offers and all the necessary forms.

Internship coordinator

Betty Folkers

room : Horst HT-609

telephone : 053 489 2772

email: stage@tnw.utwente.nl



Assistant Internship

Monique Kolff

room : Horst HT-605

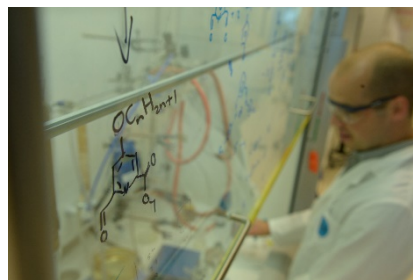
telephone 053 489 3932

email: stage@tnw.utwente.nl



MSC ASSIGNMENT

This section contains very important information on how to proceed if you have decided on a research group in which you wish to start your MSc thesis assignment within the MSc Chemical Engineering programme. Please read this information very carefully.



BEFORE STARTING THE ASSIGNMENT

As soon as you have decided in which research group you want to do your final MSc thesis assignment, please contact the head of the research group to discuss the project in detail.

Before you may start with your MSc final project, you have to have the approval of the Board of Examiners. To get this you have to:

- Fill out the **MSc final project contract and course list**. In this document you need to provide information regarding the starting date of the assignment, a short description of the assignment, the committee members, an overview of the courses you have finished already, and a list of courses that still need to be done (if applicable).
- Make sure this form is sent to BOZ-ChE (BOZ-CHE-CES@utwente.nl); att. Mrs. Erna Brus) **at least one month before** the starting date of the assignment.

After handing in the form you will receive a written letter with the decision made by the Board of Examinations. This could take a few weeks. **Please note that you cannot start before you have received this letter.**

MIDTERM EVALUATION

About halfway during the period of the MSc final project, you need to organize a midterm evaluation. Here you need to report on the progress of the assignment. Aspects related to the processing of relevant information (literature), analysis of the research problem, and actual progress on the work need to be included here.

WHEN YOU ARE READY FOR YOUR COLLOQUIUM

In order to set a date for your MSc final project colloquium, you will need to fill out the **Application MSc colloquium**. In this form you will indicate the date of your MSc colloquium and whether you have finished all the required courses of the master. *Please note that this is your final course of your MSc and you need to have finished all other courses of the curriculum.*

Please send this application form **one month before the date** of your MSc colloquium to BOZ-ChE.

Also download the **Assessment Form MSc Final Project**, which is a list of criteria that are used in the assessment. Make sure all your committee members do have a copy of this.

FORMS AND DOCUMENTS

The different forms and documents can be found on the MSc ChE website at <http://www.utwente.nl/che>. Filled out forms need to be sent to BOZ-CHE (BOZ-CHE-CES@utwente.nl).

RESEARCH GROUPS MOLECULAR & MATERIALS ENGINEERING

Fourteen research groups at the University of Twente participate in the Molecules & Materials Engineering specialization:

Biomaterials Science and Technology (BST) conducts research on (restorable) polymeric materials and structures for use in medical devices and in the delivery of relevant biologically active compounds, (bio)artificial organs, cell-material interactions and tissue engineering. <https://www.utwente.nl/en/tnw/bst/>

The **Biomolecular NanoTechnology (BNT)** group aims to understand some of the basic principles driving the formation of nano-sized objects and nano-structured materials created by nature in the course of evolution. <http://www.utwente.nl/tnw/bnt/>

BIOS Lab-on-a-Chip (BIOS) develops miniaturized analytical systems, or so-called Lab-on-a-Chip (LOC) systems, for (bio)medical and environmental applications. <http://www.utwente.nl/ewi/bios/>

Catalytic Processes & Materials (CPM) focuses on applying fundamental knowledge of molecular diffusion and reactions to heterogeneous catalysts in order to explore new catalytic materials, catalytic devices and processes relevant to industry and society. <http://cpm.tnw.utwente.nl/>

The **Film in Fluids (FIF)** group focusses on The research activities in this group revolve around three main interrelated research themes: thin films synthesis, in-situ membrane (film) characterization, inorganic hollow fibers. <https://www.utwente.nl/en/tnw/fif/>

Inorganic Materials Science (IMS) focuses on thin films with properties modified by means of doping or artificial layered structures and superstructures. <http://www.ims.tnw.utwente.nl/>

The activities of the **Inorganic Membranes (IM)** group centre on energy-efficient molecular separation using inorganic membranes under extreme conditions. The group combines materials science on the nanometre scale with process technology on a macroscopic scale. <http://utwente.nl/tnw/im/>

Materials Science and Technology of Polymers (MTP) studies a range of topics which centre on macromolecular nanotechnology and the materials chemistry of nanostructured (macro)molecular materials. <http://www.mtpgroup.nl/>

The **Membrane Science & Technology (MST)** group focuses on the multidisciplinary topic of polymer membranes with the aim of controlling mass transfer through interfaces. <http://www.utwente.nl/tnw/mtg/>

The aim of the **Mesoscale Chemical Systems (MCS)** research group is to study the behaviour and control of fluids, including miscible and immiscible liquids, gases and two-phase gas-liquid systems and of the chemical species contained in these fluids in a confined environment and, more specifically, near plain, nanostructured and/or reactive surfaces and interfaces. <http://www.utwente.nl/tnw/mcs/>

The **Molecular Nanofabrication (MnF)** group focuses on using techniques such as microcontact printing, (dip-pen) lithography and macromolecular chemistry to build larger 2D and 3D structures with novel surface properties. <http://mnf.tnw.utwente.nl/>

The research activities of the **PhotoCatalytic Synthesis (PCS)** group target the development of innovative materials and concepts to produce high-efficiency photocatalytic reactions. <http://www.utwente.nl/tnw/pcs/>

Research within the **Soft Matter, Fluidics and Interfaces (SFI)** group is directed at interfacial phenomena and processes that are relevant for mass and heat transport. <http://utwente.nl/tnw/sfi/>

CURRICULUM MOLECULES & MOLECULAR ENGINEERING

For information about the course please have a look at Osiris (also see IT services).

Compulsory courses	Electives ChE MME	Electives ChE CPE	Electives non ChE
Deficiency courses			

Year 1				
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
Core modules	AMM Molecular & Biomolecular CT (5 EC, Huskens)	AMM Organic Materials Science (5 EC, Vansco)	AMM Inorganic Materials Science (5EC, Elbersen/Koster)	AMM Project Inorg. Materials & Mol. CT (5 EC, Elbersen/Koster)
	AMM Characterization (5 EC, Huijser)	Statistical Thermo (2.5 EC, de Beer)	AMM Project Organic Materials (5 EC, Hempenius)	
	1 course from RESTS or NIKOS group (see list)			

Electives scheduled	Advanced Colloids and Interfaces (5 EC, Wood)	Electrochemistry: techniques and fundamentals (5 EC, Bouwmeester/Mei)	Physical Organic Chemistry (5 EC, Huskens)	Chemistry of Inorganic Materials and Nanostructures (ten Elshof, 5 EC)
	Gas Separations of Membranes (5 EC, de Vos)		Polymer Physics (5 EC, de Beer)	
	Advanced Catalysis (5 EC, Lefferts/Mul)	Advanced Ceramics (5 EC, Winnubst)		Elastomeric Science & Engineering (5 EC, Blume)
	Controlled Drug and Gene Delivery (5 EC, Bansal)	Lab on a chip (5 EC, Eijkel)		Biochemistry (5 EC, Poot)
		Advanced Molecular Separations (5 EC, de Vos/Schuur)		
		Nanomedicine (5 EC, Prakash)		
		Biomedical Materials Engineering (5 EC, Grijpma/Poot)		

2.5 EC Topics		Ion Transport in Fluids (Wood e.a.)	Chemical Process Analysis (Gardeniers)	Membrane Materials (Lammertink/de Vos/Benes)
			Electrochemical Engineering (Mul)	Molecular Modeling (de Beer)
				Membrane Processes (Lammertink/de Vos/Benes)

Electives n.s.	Theory of Phase Equilibria (5 EC; van der Hoef)			
	Polymers & Material Science Practice (3 EC; Hempenius)			
	Capita Selecta Research Group (5 EC)			
	Contract Research (5 EC, Betlem)			

Def.	Workshop Aca. Skills			
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Year 2				
	Quarter 1A	Quarter 1B	Quarter 2A	Quarter 2B
Core modules	Internship & Job Orientation Project (20 EC; Folkers)			
	Final Master Project (45 EC)			

ONE REFLECTION COURSE OUT OF FOLLOWING LIST

Students have to take one reflection course during their master's programme. Below you find the list from which you can choose. ***Please be aware that this list is not definite and may still change before the beginning of the academic year! If so, you will be informed by mail.***

Course code	Course name	Quarter	EC	Lecturer
201600002	Entrepreneurial Leadership & Responsible Organizational Design	1A	5	Ehrenhard
191612540	Ethics and Technology I	1B	5	Gertz
201100137	Philosophy of Engineering: Ethics	1B	2,5	Nagel
191616043	Philosophy of Engineering: Science	1B	2,5	Karaca
191616040	Philosophy of Engineering	2A	5	Karaca
201600015	Strategic Technology Management & Innovation	2A	5	Hofman
201700377	Technology Venturing	2B	5	Bliek