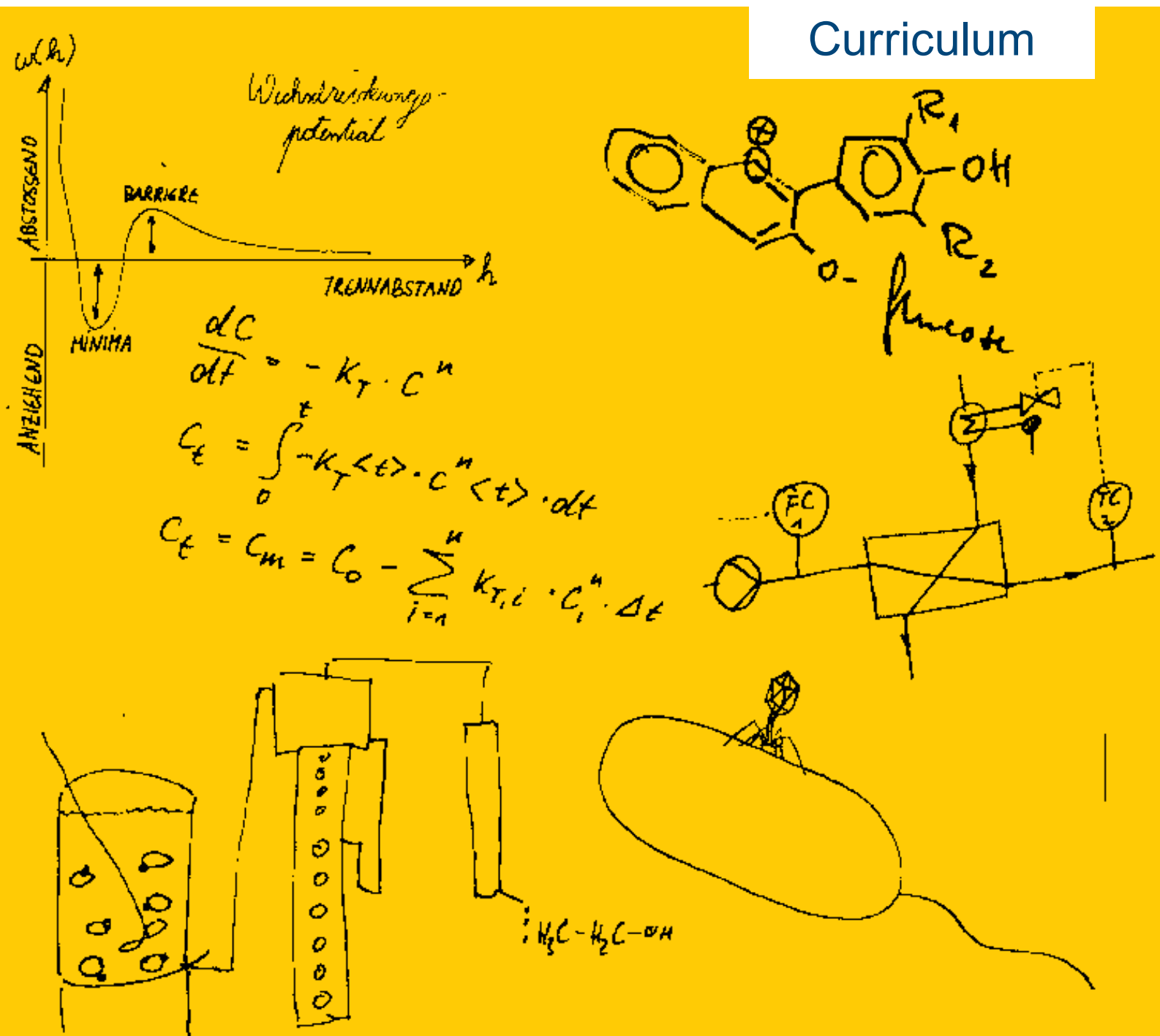


# Food Science and Engineering

## Master of Science

### Curriculum



*Wickelresistenzpotential*

ABSTOSSEND

ANZIEHEND

MINIMA

BARRIERE

TRENNABSTAND  $h$

$$\frac{dC}{dt} = -k_T \cdot C^n$$

$$C_t = \int_0^t -k_T \langle t \rangle \cdot C^n \langle t \rangle \cdot dt$$

$$C_t = C_m = C_0 - \sum_{i=1}^n k_{T,i} \cdot C_i^m \cdot \Delta t$$

fructose

FC 1

FC 2

$\text{H}_3\text{C}-\text{H}_2\text{C}-\text{OH}$

Dear students

This study guide offers an overview of the Master's programme in Food Science and Engineering. It contains all pertinent information concerning your studies in brief, as well as references to more detailed information.

Please keep in mind that all information in this guide is subject to change. For the latest updates please visit the website of the University of Hohenheim at **[www.uni-hohenheim.de](http://www.uni-hohenheim.de)**.

Answers to specific questions concerning rules and regulations of the programme can be found in the examination regulations at **[www.uni-hohenheim.de/examination-regulations](http://www.uni-hohenheim.de/examination-regulations)**.

We hope you enjoy your stay at the University of Hohenheim and wish you all the best for your studies!

Dean's Office of the Faculty of Natural Sciences &  
The Study Counsellors of Food Science and Engineering

## Contents

Final degree	2
Prescribed period of study	2
Language of instruction	2
Lecture period	2
Contents of the degree programme	2
Aims of the degree programme	3
Structure of the programme	4
Course of studies table	6
Elective modules	7
Modules of the 1st semester (WS 2013/14)	7
Modules of the 2nd semester (SS 2014)	8
Modules of the 3rd semester (WS 2014/15)	9
Examinations	10
Grading system	11
Extending the period of study	11
Before modules are completed	11
After modules are completed	12
Language course – UNIcert III	12
Career perspectives	13
Do you still have questions?	14
Overview elective modules	14
Important Dates	15
Semester dates 2013 - 2015	15
Compact course dates	15

## **Final degree**

Master of Science (M. Sc.)

## **Prescribed period of study**

4 semesters, compulsory attendance; 120 ECTS credits

## **Language of instruction**

The language of instruction is English.

## **Lecture period**

The lecture period of the winter semester lasts from mid-October to the end of January, and of the summer semester from early April until mid-July. All modules consist of compact courses lasting three weeks, with new modules commencing every third week.

The specific dates of the compact courses as well as the semester dates for the respective academic year can be found on the last page of this curriculum.

**PLEASE NOTE:** The structure of the semester is going to change beginning in the winter semester 2014/15 with modules lasting four instead of three weeks. As a result, the number of modules students have to take in one semester are reduced from five to four modules per semester. Accordingly, the credit points awarded for one module are increased from 6 to 7.5 credits.

Students enrolled before the winter semester 2014/15 are advised to complete all compulsory modules by the end of the summer semester 2014. If this is not possible, students either have to take a module awarding 7.5 credits or, if that is not an option, the study counsellors will work out individual solutions with affected students.

## **Contents of the degree programme**

Modern food processing is concerned with the transformation of animal-based and plant-based raw materials into value-added, safe and non-perishable food or nutrient formula. Food has to simultaneously meet the expectations of each individual consumer regarding appearance, smell

and taste, while also complying with the nutritional requirements of specific groups of consumers, such as infants, pregnant women, seniors or athletes. A thorough understanding of the biogenesis of raw materials and their microbiological ecology in combination with extensive expertise regarding equipment and processes allows for modern product-specific and mild processing. In addition, common additives may increasingly be foregone altogether. Foodstuffs are also developed to cater to specific dietary requirements or provide additional benefits to the consumer and may therefore contain pre-defined amounts of bio-functional substances, such as micronutrients. These products are manufactured in automated production processes using in-line sensor technology.

The processing of raw materials of agricultural production is caught between the limits of regional product diversity and the far-reaching demands of globalisation, between individual sensory pleasures and worldwide food security, between sustainability and the ability to compete in the marketplace, as well as between social demands and economic interests.

The Master's programme in Food Science and Engineering is research-oriented and attends to the interaction of complex food matrices and technical processes.

### **Aims of the degree programme**

Modern foodstuffs are designed to have a particular flavour, to conform to a specific manner of consumption or approach to life, to help balance nutritional deficits or to appeal to a specific group of consumers, and are increasingly produced from organic raw materials.

Imparting natural scientific and engineering knowledge, as well as analytical methods is a key aspect of this programme. You are prepared to deal with issues regarding food processing in a goal-oriented manner. These skills are intensively practiced and developed through practical courses, seminars and the module "Project Work." Students learn how to independently organise, execute, present and publish fundamental as well as application-oriented research projects. The programme is completed by submitting a Master's thesis, which is integrated into ongoing research projects of the department. During this process students learn to independently conduct scientific research within a team.

## Structure of the programme

During the course of the two year study programme modules in the amount of 120 credits, including the Master's thesis, have to be completed successfully. This includes six compulsory modules that expand your chemical, microbiological, physical, mathematical and technical knowledge during the first year of studies. Additionally, the necessary aspects of processing the complex food matrix are analysed. The topic for the module "Project Work" is selected from compulsory and elective modules. In addition, elective modules supplement the course of studies. These are integrated flexibly into the first three semesters depending on your area of specialisation and courses on offer. It is possible to also select elective modules of other programmes (more information on this can be found on page 6).

The basis of Food Science and Engineering is an understanding of the interaction between the complex food matrix and food processing. Accordingly, in various modules treatment processes for foodstuffs are analysed and illustrated via excursions. Innovative technology with which functional compounds from plant- or animal-based raw materials may be efficiently gained, enzymatically modified or stabilised through encapsulation, are discussed. Strategies of scientific methods, including modern chemical, physical and molecular methods, statistical methods, methods for modelling and simulating reactions within individual processing steps, are taught. During practical courses and seminars acquired knowledge is put to practice in order to consider food related problems in their natural scientific and engineering contexts, while paying attention to economic aspects.

The project work serves to introduce students to working independently on a scientific project and prepares them for their Master's thesis. You are free to choose when you want to complete your project work. However, it must be completed before starting to write the Master's thesis at the latest. The execution of the project work is done in consultation with a supervisor assigned by the department (postgraduate scientific staff member).

The research and development internship (elective module) may be integrated in the course of your studies on an individual basis. Please con-

tact your supervising professor before the internship begins in order to establish a timeframe and academic requirements.

With the completion of the Master's thesis at the end of the fourth semester you demonstrate your ability to do independent scientific work.

## Course of studies table

	6 Credits   1 <sup>st</sup> Module slot	6 Credits   2 <sup>nd</sup> Module slot	6 Credits   3 <sup>rd</sup> Module slot	6 Credits   4 <sup>th</sup> Module slot	6 Credits   5 <sup>th</sup> Module slot
1 <sup>st</sup> Sem.	Analysis and Quality Assurance in the Food Production (1504-500)	Applied Mathematics for the Life Sciences (1101-400)	Food Process Design I - Efficient Processing and Transport Phenomena (1503-520)	Soft Matter Science I - Food Rheology and Structure (1505-500)	
2 <sup>nd</sup> Sem.	Soft Matter Science II - Food Physics (1507-510)	Elective Modules*			
3 <sup>rd</sup> Sem.	Project Work (compulsory) (1500-530)				
4 <sup>th</sup> Sem.	Master's Thesis Food Science and Engineering (1500-410)				

\* Depending on your area of specialization and courses on offer you choose elective modules in the amount of 54 ECTS credits. These are integrated flexibly into the course of the first three semesters.

This table represents a recommendation for the ideal course of studies during the four semester Master's programme. It shows which modules should be completed in which semester. Depending on the course offerings deviations are partly possible, as long as they conform to the rules set forth in the study and examination regulations.



Detailed information on individual modules and their corresponding courses, as well as the current state of courses on offer may be obtained at [www.uni-hohenheim.de/module-catalogue/fse](http://www.uni-hohenheim.de/module-catalogue/fse).



## Elective modules

In addition to the compulsory modules included in the course of studies table, you have to complete elective modules in the amount of 54 credits. These modules can be integrated flexibly into the first three semesters, depending on the availability of modules.

Elective modules on offer:

### Modules of the 1st semester (WS 2013/14)

Module slot	Module dates	Code	Module title	Module type
1	14.10. – 01.11.2013	1504-500	Analysis and Quality Assurance in the Food Production	C
2	04.11. – 22.11.2013	1101-400	Applied Mathematics for the Life Sciences	C
3	25.11. – 13.12.2013	1503-520	Food Process Design I – Efficient Processing and Transport Phenomena	C
4	16.12. – 20.12.2013 07.01. – 17.01.2014	1505-500	Soft Matter Science I – Rheology and Structure	C
5	20.01. – 07.02.2014	1510-400	Downstream Processing	E
5	20.01. – 07.02.2014	1403-410	Biofunktionalität, Toxikologie und Sicherheit von Lebensmitteln (taught in German)	E

## Modules of the 2nd semester (SS 2014)

Module slot	Module dates	Code	Module title	Module type
1	07.04. – 25.04.2014	1507-510	Soft Matter Science II – Food Physics	C
2	28.04. – 16.05.2014	1502-490	Industrial Case Studies - FMB	E
2	28.04. – 16.05.2014	1505-440	Dairy Science and Technology	E
2	28.04. – 16.05.2014	1509-500	Advanced Process Engineering Techniques for Cereal Processing	E
3	19.05. – 06.06.2014	1503-500	Food Process Design II – Process integration and Scale-up	E
3	19.05. – 06.06.2014	1504-430	Technologie Pflanzlicher Lebensmittel II	E
3	19.05. – 06.06.2014	1502-510	Enzyme Technology	E
3	19.05. – 06.06.2014	1402-450	Nutrient Gene Interaction II	E
3	19.05. – 06.06.2014	1301-450	Metal Coordination Chemistry in Biomolecules	E
4	16.06. – 04.07.2014	1503-540	Drying, Granulation and Instantisation	E
4	16.06. – 04.07.2014	1101-430	Modelling and Simulation of Biochemical Reaction Networks	E
4	16.06. – 04.07.2014	1506-500	Bioethanol and Distilled Spirits	E
4	16.06. – 04.07.2014	1701-410	Instrumentelle Analytik und Bioassays (taught in German)	E
5	21.07. – 12.08.2014	4902-430	Food and Nutrition Security	E
5	07.07. – 25.07.2014	1508-400	Advanced Sensory Analysis of Foods	E

Lecture free period: 09.06. – 14.06.2014 (Pentecost)

## Modules of the 3rd semester (WS 2014/15)

Module slot	Module dates	Code	Module title	Module type
1	13.10. - 07.11.2014	1503-510	Process Driven Product Design: Cereals and Sweets	E
1	13.10. - 07.11.2014	1505-420	Innovative Milchtechnologie (taught in German)	E
1	13.10. - 07.11.2014	1303-420	Physical Chemistry (Research Internship)	E
1	13.10. - 07.11.2014	1507-500	Advanced Meat Science and Technology	E
1	13.10. – 07.11.2014	1502-500	Scientific Writing and Reporting	E
1	13.10. – 07.11.2014	4704-430	Food Chain Eier und Geflügelfleisch (taught in German)	E
2	10.11. – 05.12.2014	1504-510	Plant Foodstuff Technology I	E
2	10.11. – 05.12.2014	1102-510	Applied Statistics for the Life Sciences	E
2	10.11. – 05.12.2014	1503-530	Industrial Case Studies – FSE	E
2	10.11. – 05.12.2014	1303-420	Physical Chemistry (Research Internship)	E
2	10.11. – 05.12.2014	1501-400	Fermentation Technology	E
3	08.12. – 19.12.2014 07.01 – 16.01.2015	1510-400	Downstream Processing	E
3	08.12. – 19.12.2014 07.01 – 16.01.2015	1402-440	Nutrient Gene Interaction I	E
3	08.12. – 19.12.2014 07.01.-16.01.2015	2303-430	Molekulare Sinnesphysiologie (taught in German)	E
4	19.01. – 13.02.2015	1504-530	Plant Foodstuff Technology III	E

You may choose elective modules of the Food Science and Engineering programme, of other natural science Master's programmes of the University of Hohenheim or of other degree programmes offered at the University of Hohenheim or at other German or foreign universities, for which a successful petition with the board of examiners is required.



Detailed information on individual modules, their corresponding courses, the current state of courses on offer as well as on how to register for exams may be obtained at [www.uni-hohenheim.de/module-catalogue/fse](http://www.uni-hohenheim.de/module-catalogue/fse).

For any changes please see the latest version of the curriculum at [www.uni-hohenheim.de/curricula](http://www.uni-hohenheim.de/curricula).

## Examinations

Each module of the Master's programme in Food Science and Engineering is completed with an examination. Modules counting towards the final grade are graded according to the German grading system, while modules that do not count towards the final grade are graded either according to the German grading system or marked with either "pass" or "fail." They do not count towards the final grade point average on the Master's degree certificate.

Types of examinations offered at the University of Hohenheim include written and oral examinations, protocols of practical courses, preparation and presentation of contributions to seminars, as well as colloquia.

Written and oral examinations have to be taken during the examination period. Other assignments, such as protocols, reports, presentations, etc. are to be handed in during the lecture period.

Two examination periods are assigned to every module. The first examination period commences right after the end of the lecture period, while the second takes place at the end of the lecture-free period. You have to register for every exam. Please check the online module catalogue for information on how to register for the respective exam. The dates for module examinations are set by the party responsible for the respective module.

Examination periods:

semester	Examination period (EP)
winter 2013/14 (1st EP)	03.02.2014 – 22.02.2014
winter 2013/14 (2nd EP)	24.03.2014 – 05.04.2014
summer 2014 (1st EP)	21.07.2014 – 09.08.2014

summer 2014 (2nd EP)	22.09.2014 – 11.10.2014
winter 2014/15 (1st EP)	09.02.2015 – 28.02.2015
winter 2014/15 (2nd EP)	30.03.2015 – 10.04.2015

Detailed information regarding requirements, type and duration of the examination, as well as the employed grading system may be found in the examination regulations of the Master's programmes of the Faculty of Natural Sciences.

Information on the respective valid examination regulations, deadlines, examination dates, etc. may be obtained at the examinations office or online at [www.uni-hohenheim.de/exams](http://www.uni-hohenheim.de/exams)

### Grading system

Grades	German	English
1,0	<i>sehr gut</i>	very good
1,3		
1,7	<i>gut</i>	good
2,0		
2,3		
2,7	<i>befriedigend</i>	satisfactory
3,0		
3,3		
3,7	<i>ausreichend</i>	sufficient
4,0		
> 4,0	<i>nicht ausreichend</i>	fail

### Extending the period of study

Whilst the standard period of study is four semesters, the programme does not require students to complete their studies within that time. There are ways and reasons to naturally extend the period of study. Please note that the maximum period of study is 6 semesters.

### Before modules are completed

If students have yet to complete their regular modules, excluding the Master's thesis, it is possible to take an *Urlaubssemester* (semester on

leave). During this time students are free to spend a semester abroad, take courses and examinations at a host university. Completed modules can be accredited by the University of Hohenheim and thus contribute towards the degree. It is also possible to complete a prolonged internship, which may also be an extension of an internship done as part of an elective module; however, no extra credit is awarded.

A semester on leave provides students with the necessary flexibility to plan their studies on an individual basis. This need not necessarily extend the period of study. For further information on when a semester on leave can be granted please visit **[www.uni-hohenheim.de/academicleaveofabsence](http://www.uni-hohenheim.de/academicleaveofabsence)**

### **After modules are completed**

Once students have successfully completed their last module, with only the master's thesis left, they have six months before they are required to begin working on their thesis. However, the maximum period of study is 6 semesters, which cannot be extended. Students may, of course, opt to start writing their thesis right away. These six months provide students with the opportunity to do an internship or spend a semester abroad outside the constraints of the study programme. However, neither of these activities can be accredited, since all credits necessary have already been accumulated.

For further information on exchange semesters please visit the website of the Office of International Affairs at **[exchange.uni-hohenheim.de](http://exchange.uni-hohenheim.de)**.

For Further information on internships please visit the website of the Internship Office at **[uhoh.de/praktikum](http://uhoh.de/praktikum)**

### **Language course – UNIcert III**

UNIcert III – “English for Scientific Purposes” courses are available for all students of the Faculty of Natural Sciences. These courses are intended to aid students in improving their English skills and provide them with an internationally recognized language certificate. This UNIcert III programme is designed to meet the specific needs of our students and can easily be integrated into the course of studies as an elective module.

For further information please visit **[www.natur.uni-hohenheim.de/languagecourse](http://www.natur.uni-hohenheim.de/languagecourse)**.

German language courses are also available. For more information please visit **<https://spraz.uni-hohenheim.de/deutsch>**.

## **Career perspectives**

Your interdisciplinary expertise in the natural sciences and engineering, as well as your expert knowledge of complex food systems leads to many excellent job opportunities in various areas both nationally and internationally:

- in the food and Life Science industry, pharmaceutical companies, the health care and biotechnology sector, the packaging industry, as well as their supplying industries
- leading positions in research and development, process and machine planning and construction, production and quality assurance
- advisory positions
- employment in marketing departments

With an above-average degree you also have the option of pursuing further academic qualifications by writing a doctoral dissertation at a university in German or abroad. This provides a path to leading positions in research and development or, if you are interested in economics, into management positions of international companies.

You have successfully completed your studies and are wondering what to do next? If you want to enter the job market outside academia, you are advised to contact the CareerCenter for guidance. The CareerCenter Hohenheim is a service center and the first contact point for students and graduates for guidance when creating your own profile, as well as assistance with your career entry and career planning. For more information please visit **[www.uni-hohenheim.de/careerentry](http://www.uni-hohenheim.de/careerentry)**.





## Important Dates

### Semester dates 2013 - 2015

Semester	Start of lectures	End of lectures	Holidays
Winter 2013/14	14.10.2013	01.02.2014	23.12.2013 - 06.01.2014
Summer 2014	07.04.2014	19.07.2014	10.06.2014 - 14.06.2014
Winter 2014/15	13.10.2014	07.02.2015	22.12.2014 - 06.01.2015
Summer 2015	13.04.2015	25.07.2015	26.05.2015 - 30.05.2015

### Compact course dates

Winter semester 2013/14		Summer semester 2014	
Order	Dates	Order	Dates
1	14.10. - 01.11.2013	1	07.04. - 25.04.2014
2	04.11. - 22.11.2013	2	28.04. - 16.05.2014
3	25.11. - 13.12.2013	3	19.05. - 06.06.2014
4	16.12. - 20.12.2013 07.01. - 17.01.2014	4	16.06. - 04.07.2014
5	20.01. - 07.02.2014	5	07.07. - 25.07.2014





