UNIVERSITÄT BAYREUTH

LIFE SCIENCES
Food · Nutrition · Health

Module handbook

M5 a52 Food Quality and Safety
Faculty of Life Sciences: Food, Nutrition and Health
University of Bayreuth - Germany

General information and reading notes

A central component of the Bologna process is the modularisation of degree programmes which means a switch from the former course system to a modular system by grouping thematically related courses into course bundles - or modules.

This module handbook contains the description of all modules offered in the degree programme. The module handbook provides transparency and gives students, prospective students and other internal and external interested persons with information on the content of the individual modules, their qualification goals as well as qualitative and quantitative requirements.

Legal force
Module descriptions serve to increase transparency and provide better orientation regarding the modules of a degree programme. Only the relevant examination and study regulations are legally binding.

Examinations
The module handbook provides information on the module examinations. Slashes are to be read as "or" and denote alternative examination forms. If a module has partial examinations, their respective weighting is indicated. The weighting is relevant for the calculation of the overall module grade.
The scope and duration of the respective examination forms are regulated in the examination and study regulations of the programme.

Table of contents

Alphabetical index can be found on page 20

Fak720424: Food Microbiology

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	75	
Credit points:	**Frequency:**	**Self-study hours:**	
6	winter semester	105	

Person responsible for the module:
Lackner, Gerald; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	70
Protocol	30

Prerequisites:
- Basic knowledge in chemistry and biology.

Learning objectives:
The students acquire basic knowledge about the structure and function of microbial cells, their key roles for food spoilage, food production, and human health. Moreover, principles of detection of microorganisms as well as hygiene concepts will be introduced.

Learning contents:
Lecture:
- Microorganisms
- Spoilage
- Food preservation
- Foodborne illness
- Microorganisms in food production (e.g. fermentation)
- Principles of hygiene concepts e.g. HAACP

Lab work:
- Basic microbiological examination techniques
- Quantitative and qualitative detection of microbial contamination in food
- Growth inhibitors (e.g. antibiotic residues) in food
- Yogurt fermentation

Type and scope of the courses:
Lecture (2 hours per week)
Laboratory course (3 hours per week)

Fak720531: Crop Plant and Animal Biology

Valid from: 01.10.2021

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	90	
Credit points:	**Frequency:**	**Self-study hours:**	
7	winter semester	120	

Person responsible for the module:
Henkel-Oberländer, Janin; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	50
Protocol	30
Presentation	20

Prerequisites:

- Basic knowledge in biology

Recommendes literature
- Molecular Cell Biology; H. Lodish, A Berk, CA Kaiser, M Krieger, A Bretscher, H Ploegh, A Amon, KC Martin
- Cell Biology; TD Pollard, WC Earnshaw, J Lippincott-Schwartz, GT Johnson
- Molecular Biology of the Cell; B Alberts, A Johnson, J Lewis, D Morgan, M Raff, K Roberts, P Walter
- Essentials of Biochemistry; HJ Fromm, M Hargrove

Learning objectives:

The students acquire basic knowledge in molecular biology, biochemistry and cell biology of plants and mammals.
Furthermore, they learn basics in physiology and know major metabolic pathways.
Based on this knowledge, they are able to understand the role of food composition in the context of human nutrition and health.

Learning contents:

- Components of eukaryotic cells and their functions
- Morphology and anatomy of plants and mammals
- Basics in molecular biology and cell signalling
- Principles of energy metabolism
- Major catabolic and anabolic pathways
- Basics in genetics
- Agriculture and global biogeochemical cycles
- Practical lab work with basic methods in molecular biology and biochemistry

Type and scope of the courses:

Lecture/seminar (4 hours per week)
Laboratory course (3 hours per week)

Fak720532: Nutrition Physiology and Immunology

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	75	
Credit points:	**Frequency:**	**Self-study hours:**	
6	summer semester	105	

Person responsible for the module:
Henkel-Oberländer, Janin; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	50
Protocol	30
Presentation	20

Prerequisites:

- Module Crop Plant and Farm Animal Biology.

Recommendes literature:
- Human Physiology: An Integrated Approach; Silverthorn DU; Pearson
- Marks' Basic Medical Biochemistry – A Clinic Approach; Wolters Kluwer; Lieberman M, Peet A
- Gastrointestinal Physiology; Elsevier; Johnson LR-Costanzo LS: Broad Review Series – Physiology; Wolters Kluwer
- Doan, T: Lippincott Illustrated Reviews – Immunology; Wolters Kluwer

Learning objectives:

The students acquire basic and specific knowledge in the digestion of food, the functions of macro- and micronutrients in human nutrition and their role in the regulation of metabolic homeostasis. The students know nutrition-related diseases and can describe the pathogenesis of over- and undernutrition. They understand the principles in immune response and can explain the organisation of the immune system.
Based on this knowledge, they are able to understand the role of food composition in the context of human nutrition and health.

Learning contents:

- Anatomy and function of the gastrointestinal tract
- Digestion of macronutrients
- Regulation of energy metabolism
- Role of macro- and micronutrients in human nutrition
- Malnutrition: pathogenesis of undernutrition and overnutrition
- Control of food intake and sensory biology
- Organisation and functions of the immune system
- Practical lab work with methods in (molecular) physiology

Type and scope of the courses:

Lecture (2 hours per week)
Laboratory course (3 hours per week)

Fak720533: Chemical Food Analysis

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	90	
Credit points:	**Frequency:**	**Self-study hours:**	
6	summer semester	90	

Person responsible for the module:
Römpp, Andreas; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	70
Protocol	30

Prerequisites:

- Basic knowledge in chemistry and physics
- Basic knowledge of statistical methods
- Practical experience in wet lab chemistry

Learning objectives:

The students acquire detailed and differentiated knowledge about analytical techniques used in food analysis. Sample preparation and data analysis and interpretation are also essential topics covered in this module. Based on this knowledge, the students are able to assess capabilities and limitations of a range of analytical approaches. The students are also able to critically evaluate their own experimental data as well as published studies.

Learning contents:

This course covers classical wet lab chemistry as well as instrumental techniques such as spectroscopy, chromatography and mass spectrometry. It also includes a range of analytical protocol for specific analytes and food items. This includes major and minor constituents, food additives as well as biological and chemical contaminants.

Type and scope of the courses:

Lecture (2 hours per week)
Laboratory course (3 hours per week)

Fak720530: Food Metabolome and Toxicology

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	two semesters	105	
Credit points:	**Frequency:**	**Self-study hours:**	
6	winter semester	75	

Person responsible for the module:
Baldermann, Susanne; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	50
Protocol	30
Presentation	20

Prerequisites:

- Basic knowledge in chemistry and biology
- Practical experience in chemistry and biology lab courses

Recommendes literature:
- Food Chemistry, Belitz, H.-D., Grosch, Werner, Schieberle, Peter,
- Introduction to Food Toxicology, Takayuki Shibamoto, Leonard F. Bjeldanes
- Food Analysis, S. Suzanne Nielsen

Learning objectives:

With over 25 000 compounds known in various foods, the food metabolome is extremely complex. The students acquire detailed and differentiated knowledge about essential and non-essential compounds derived from foods. Furthermore, the module also teaches a foundational understanding of residues and contaminants their toxic effects, toxicokinetics and toxicodynamics.
Standard analysis and testing procedures for food components, pesticides, food additives, and other xenobiotics will be explained.

Learning contents:

Lecture:
- Profound knowledge in food chemistry, including macro and minor components, minerals, trace elements, vitamins and phytochemicals
- Basic knowledge about residues and contaminants
- Toxicological effects, critical values including supporting examples
- Basic principles of the metabolism of xenobiotics (ADME - Absorption, Distribution, Metabolismus und Elimination)

Seminar and laboratory course.
- Basic knowledge analysis of the food metabolome
- Basic principles for testing procedures

Type and scope of the courses:

Lecture (2 hours per week)
Seminar (2 hour per week)
Laboratory course (3 hours per week)

Fak720425: Data Analysis and Statistics

Valid from: 01.04.2024

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
6	winter semester	120	

Person responsible for the module:
Allmeta, Anila

Description of coursework and examinations:

Title:	Weight:
Written examination	100

Prerequisites:
None

Learning objectives:
The students acquire basic knowledge about data types, descriptive and inferential statistics. Furthermore, they know about types of data visualisation and their advantages and disadvantages. They can use software to analyse and visualise data. Based on this knowledge they are able to choose the appropriate types of analysis and visualisation for a range of problems.

Learning contents:
- Types of data
- Descriptive statistics
- Inferential statistics
- Data visualisation

Type and scope of the courses:
Lecture (2 hours per week)
Seminar (2 hours per week)

Fak720426: Introduction to Law and Food Law

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
5	winter semester	90	

Person responsible for the module:
Purnhagen, Kai; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	100

Prerequisites:
None

Learning objectives:

At the end of the course students are expected to
- Describe legal families, understanding their differences and analyze their interactions through examples
- Distinguish between different branches of a legal systems and analyze their interactions through examples
- Distinguish between national, international and supranational legal systems and analyze their interactions,
- Distinguish between different sources of international law
- Describe the main features of the TBT and the SPS agreement
- Describe the features of the peaceful settlement of disputes under the WTO
- Know the main aspects of International Human Rights Law
- Describe the role and the characteristics of private standards
- Describe the roles and functions of EU institutions, as well as the basis of their historical development
- Be able to assess whether a competence is within the sphere of the EU or of the Member States
- Be able to describe the ordinary legislative procedure in the EU
- Understand the ´four fundamental freedoms´ and the functioning of the internal market
- Describe the "Brussel effect"
- Describe the principles at the base of EU Food Law and know its main provisions
- Describe the main provisions of selected pieces of EU food legislation (e.g. labelling law, novel food regulation, GMO directive, hygiene package)
- Identify the main features of the CAP
- Develop legal thinking skills
- Be able to recall legal information (laws, interpretations, cases) from the major EU law databases,
- Bring theory and practice together, applying the legal perspective acquired in the lectures to real-life examples

Learning contents:

The purpose of the course is to provide students with a well-rounded introduction to law, with a specific focus on EU Law, International Law, and EU food law. The course is divided into three thematic blocks, starting with a general introduction to law and legal thinking, followed by an introduction into International Law and institutions and by an overview on the European Union law and Food Law specifically.

Type and scope of the courses:

Lecture (2 hours per week)
Tutorial (2 hours per week)

Fak720427: Food Safety and Risk Management Law

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
5	summer semester	90	

Person responsible for the module:
Brzezinski-Hofmann, Katja; Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	100

Prerequisites:

No previous knowledge is required to attend the course. However, the previous attendance and completion of the course "Introduction to Law and Food Law" is strongly recommended.

Learning objectives:

At the end of the course students are expected to
- Understand how the major aspects of food safety are regulated in EU law
- Recall the three components of the risk analysis principle and explain how they influence the legal approach to food safety
- Identify the laws related to food safety in the EU and describe their most relevant provisions
- Explain how these laws are enforced and who is responsible for their enforcement
- Identify the key actors of the food chain and outline their roles and responsibilities
- Understand the concepts of food business operator and liability
- Apply the legal perspective acquired in the lectures to real-life examples

Learning contents:

The purpose of the course is to provide students with a well-rounded and interdisciplinary understanding of the legal and theoretical frameworks governing food safety and food safety-related risk management in the EU, illustrated by examples of its implementation in real-life situations. The main topics include: the General Food Law and its most relevant provisions, the legal framework of food information within the EU (including labelling aspects and nutrition and health claims), and diverse additional EU food regulations on relevant topics, such as novel foods, GMOs, food contact materials, foods for specific groups, supplements, additives, …

Type and scope of the courses:

Lecture (2 hours per week)
Tutorial (2 hours per week)

Fak720428: Food Trade Law

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
4	winter semester	60	

Person responsible for the module:
Purnhagen, Kai; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination/ term paper	100

Prerequisites:
Introduction to Law and Food Law

Learning objectives:
At the end of the course students are expected to
- Understand relevant international instruments pertaining to the international trade law area
- Apply the fundamental principles of the WTO framework
- Utilize the rules of major trade agreements
- Understand the complexities between international trade law, environment, agriculture, public health and intellectual property rights
- Understand finance related aspects that influence foreign trade and investment

Learning contents:
This course offers an overview of Global Economic Law, with an emphasis on the food aspects. It will introduce students to the treaty architecture of the World Trade Organization (WTO) and certain other regional trade arrangements. Topics will include the historical, legal and regulatory rationale as well as political economy of the international trade framework, the relationship between international and domestic law and regulation in particular in the light of state arbitration and compliance issues, the standard-setting and the WTO dispute resolution system. Particular attention will also be directed to the Agreement on Technical Barriers to Trade and the Agreement on the Application of Sanitary and Phytosanitary Measures.

Type and scope of the courses:
Lecture (2 hours per week)
Tutorial (2 hours per week)

Fak720429: Food Quality and Food Authenticity Law

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	30	
Credit points:	**Frequency:**	**Self-study hours:**	
4	winter semester	90	

Person responsible for the module:
Reinhardt, Tilman; Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	100

Prerequisites:
None

Learning objectives:
At the end of the course students are expected to:
- Understand and define the concepts of food safety, food quality, and food authenticity, and differentiate between them
- Know the main regulatory framework for food quality and food authenticity in the EU
- Know the EU quality schemes for geographical indications and traditional specialties, as well as the EU organic framework
- Know about the administrative structure for implementing and supporting food quality and food authenticity in the EU
- Be able to conduct research and present findings on current topics related to food quality, food authenticity and sustainability regulation

Learning contents:
The course offers students an introduction to key topics of food quality and food authenticity, in particular on labelling. The course is based on a research-based learning methodology and requires students to conduct small research project under the guidance of the tutors. Guest lecturers will be involved and excursions might take place.

Type and scope of the courses:
Seminar (2 hours per week)

Fak720430: Food Quality Management

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
5	summer semester	90	

Person responsible for the module:
Fikar, Christian; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	60
Semester-long assignments	40

Prerequisites:
None

Learning objectives:
After completion of the course, students will understand key concepts of food quality management and are able to highlight their importance within the food industry. They are familiar with common tools and management concepts to improve performance and reduce error rates.

Learning contents:
The course tackles:
- Introduction to food quality management
- Continuous improvement cycles
- Process modelling
- Statistical process control
- Lean management
- Risk management
- HACCP and GMP

Type and scope of the courses:
Lecture (2 hours per week)
Seminar (2 hours per week)

Fak720431: Food Supply Chain Management

Valid from: 01.04.2020

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	60	
Credit points:	**Frequency:**	**Self-study hours:**	
5	summer semester	90	

Person responsible for the module:
Fikar, Christian; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Written examination	60
Semester-long assignments	40

Prerequisites:
None

Learning objectives:
After completion of the course, students will understand key concepts of supply chain management and are able to highlight their importance within the food industry. They will be able to investigate various supply chain structures and develop concepts on how to improve transparency and coordination within such systems.

Learning contents:
The course tackles:
- Introduction to food supply chains
- Supply chain drivers and metrics
- Supply chain network designs
- Demand forecasting
- Aggregated planning
- Supply chain coordination
- Uncertainty in food supply chains

Type and scope of the courses:
Lecture (2 hours per week)
Seminar (2 hours per week)

Fak721985: Science Communication

Valid from: 01.10.2021

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	30	
Credit points:	**Frequency:**	**Self-study hours:**	
3	summer semester	60	

Person responsible for the module:
Bartelmeß, Tina; Prof. Dr.

Description of coursework and examinations:

Title:	Weight:
Essay	100

Learning objectives:

Students acquire knowledge of the theoretical foundations of communicating science to the public. They deal with scientific literature and prepare it for specific target groups. They develop and practise various strategies to reach target groups effectively. In addition, students acquire skills in writing texts and designing visual representations to effectively communicate scientific findings to the public.

Learning contents:

- Scientists and the public
- Perspectives of research on scholarly and science communication
- Target groups and their characterisation
- Models, theories and approaches of science communication
- Texts, visuals, types, media, and practices of science communication

Type and scope of the courses:

Seminar (2 hours per week)

Fak721986: Case Studies

Valid from: 01.10.2021

Teaching language:	Duration:	Contact hours:	Link to HTML page
English	one semester	30	
Credit points:	**Frequency:**	**Self-study hours:**	
7	winter semester	180	

Person responsible for the module:
Grenzfurtner, Wolfgang; Dr.

Description of coursework and examinations:

Title:	Weight:
Report and presentation	100

Prerequisites:
None

Learning objectives:
Students can successfully conduct an interdisciplinary research project in the context of the study programme in small groups and report on the findings of their research. Upon completion of this course:
- Students will be able to independently prepare and conduct research projects.
- Students can apply different data generation methods.
- Students will be able to apply analytical technics and generate scientific findings from their research project.
- Students gain an insight into how research projects are conducted in practice. (Based on the simulation of these mini research projects)
Students are able to conduct research projects in an interdisciplinary setting

Learning contents:
The course offers food quality and safety students an insight into practical scientific work and better prepares them for their master's thesis by requiring students to work on an interdisciplinary research topic themselves. In the process, the execution of a research project is simulated in mini scale. During this course, (1) the students design their research project, (2) they collect and analyse data, (3) they present the research proposal at the interim presentation as well as final results at the end presentation, and (4) they submit the first draft of the report and have to review the draft report of a companion group. The students have (5) to comment on the suggestions for improvement from the peer review, how they have taken them into account in their work or why they have decided against them. This is done in the letter of response, which they submit together with the (6) final version of the report. In this way, the students experience how a research process is carried out, which is close to the reality of a research project.
Students work in teams of two or three on challenging interdisciplinary problems regarding food, nutrition and health. Teaching teams form, hand out the problem and support the students in their research through regular meetings and critical feedback.
Results are presented in writing and in oral interim and end presentations. The latter is integrated into a joint seminar. Students have to peer review another group's case study reports and submit a written review. In addition, they have to give feedback to the other groups during the interim and end presentation.

Type and scope of the courses:
Project work and joint seminar

Fak725991: Mandatory Internship (Praktikum)

Valid from: 01.10.2022

Teaching language:	Duration:	Contact hours:	Link to HTML page
German/English	one semester	0	
Credit points:	**Frequency:**	**Self-study hours:**	
15	every semester	450	

Person responsible for the module:
Dr. Brit-Maren Schjeide

Description of coursework and examinations:

Title:	Weight:
Report (ungraded)	100

Prerequisites:
None

Learning objectives:
Students can apply their theoretical knowledge in practical activities or research and learn to train their soft skills through both autonomous endeavours and teamwork. Furthermore, students can independently reflect upon and professionalise their own competences.

Learning contents:
Depending on internship place

Type and scope of the courses:
Full-time internship of (at least) 12 weeks

Fak722487: Masterarbeit – Food Quality and Safety

Valid from: 01.10.2021

Teaching language:	Duration:	Contact hours:	Link to HTML page
German/English	one semester		
Credit points:	**Frequency:**	**Self-study hours:**	
30	every semester	900	

Person responsible for the module:
All professors

Description of coursework and examinations:

Title:	Weight:
Master's thesis	100

Prerequisites:
It is recommended to have completed the modules from semesters 1-3

Learning objectives:
Students acquire the ability to work independently on a comprehensive research question within a given period using scientific methods.
In addition to the technical competence required for this, students have further developed their methodological competence and self-competence in the process.

Learning contents:
Formulating an adequate research question (topic identification), developing a concept, literature research, data collection and evaluation or literature and source analysis, writing a scientific thesis.

Type and scope of the courses:
Independent research under supervision

Index