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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

Module Guide Food Chemistry

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BLM-01	General Inorganic Chemistry	1st semester	6 CP
module description	Introduction to General and Organic Chemistry		
module code	BLM-01		
faculty / subject / department	faculty 08 / chemistry / inorganic chemistry		
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester, Chemistry BSc / 1 st semester, AdvMater BSc / 1 st semester		
module coordinator	Cf. German version		
prerequisites	none		
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • be proficient in the fundamental concepts of chemistry, such as the periodic table, the language of chemical formulae, units, stoichiometric calculations, • have comprehended the basic principles of inorganic (acids, bases, redox) and organic (functional groups) chemistry, • possess an overview of the chemical properties of the elements and compounds of particularly important main group elements, • possess sound fundamental knowledge of the most important chemical reactions in inorganic chemistry • possess, on the basis of the periodic table, an overview of the extensive substance properties of chemical elements and compounds • have knowledge of, or, respectively, assess the tendencies in chemical and physical properties – especially with regard to connections that can be deduced from the periodic table, • possess a consolidated understanding of chemical reactions. 		
content of module	<ul style="list-style-type: none"> • atomic and molecular structure • periodic table, elements in nature • chemical bonding • chemical equations, stoichiometry • chemical properties, solutions, mixtures, osmosis • acid-base reaction; buffer systems; pH values • redox reactions, redox potentials, electrochemistry • chemical equilibrium/thermodynamics/catalysis • introduction to selected s- and p-block elements • the periodic table of elements • occurrence, manufacture and structure-property relationships of the elements of the <ul style="list-style-type: none"> ○ s- and p-block ○ d-block ○ f-block • the fundamental substance classes of these elements • technical procedures • using these elements in practice 		
forms of instruction	lecture (4 h / week), practice courses (1 h / week)		
workload in total (h)	180	Credit Points: 6 CP	
consisting of A courses	lecture	practice course	
Aa contact hours	60	15	
Ab preparation, follow-up	36	45	
B autonomous work			
C module examination(s)	24		
examination forms, final grade consists of	form: 2 written or oral examinations (100%) (admission: having solved 50% of the practice tasks)		
form of the module-	written or oral examination		

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component retake examination form of the module retake examination	
frequency , duration in semesters	winter semester, 1 semester
intake capacity of the courses	30
language	German

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-02	Laboratory Course on General Chemistry		1st semester	5 CP
module description	Practical Introduction to General and Inorganic Chemistry for Food Chemists			
module code	BLM-02			
faculty / subject / department	faculty 08 / chemistry / inorganic chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester			
module coordinator	Cf. German version			
prerequisites	none			
course aims	Students should ... <ul style="list-style-type: none"> • have secure command of the fundamental practical laboratory procedures, aiming at good laboratory practice • be able to correctly estimate dangers of working with chemicals and instruments • be proficient in the basics of workplace safety • be able to organise the documentation of experiments so that it is clear and comprehensible • be able to perceive connections between practical work and the underlying theories • have gathered experience in the analysis and synthesis of simple chemical compounds and mixtures 			
content of module	<ul style="list-style-type: none"> • practical experiments in general and inorganic chemistry • basic chemical procedures • chemical analytics • preparation of simple chemical compounds 			
forms of instruction	laboratory course (3.2 h / week) and seminar (1 h / week)			
workload in total (h)	150		Credit Points: 5 CP	
consisting of A courses	seminar	laboratory course		
Aa contact hours	15	48		
Ab preparation, follow-up	15	36		
B autonomous work	written presentation 15			
C module examination(s)	21			
examination forms, final grade consists of	form: written or oral examination (100%) (admission: all protocols accepted, (written) presentation)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-03	Mathematics for Chemists		1st semester	6 CP
module description	Mathematics for Chemists			
module code	BLM-03			
faculty / subject / department	faculty 07 / mathematics			
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester, Chemistry BSc / 1 st semester			
module coordinator	Cf. German version			
prerequisites	none			
course aims	<p>Students should be able to apply mathematical methods of</p> <ul style="list-style-type: none"> • vector calculus, • matrix calculus, • differential and integral calculus of one and more variables, • the field of differential equation <p>in order to describe chemical and physical processes.</p>			
content of module	<p><u>analysis</u>: numbers, sequences, series, functions (polynomial, e, ln, sin, cos, tan, cos, arcus), complex numbers, continuity, differential and integral calculus in one dimension, Taylor series, solving simple linear and inhomogeneous differential equations; differential calculus of several variables (total differential); integral calculus of several variables: line integral, partial differential equation using the example of wave equation.</p> <p><u>linear algebra</u>: vectors, matrices, solving systems of linear equation, determinant, eigenvalue, eigenvector</p>			
forms of instruction	lecture (3 h / week), practice course (1.6 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	45	24		
Ab preparation, follow-up	23	48		
B autonomous work				
C module examination(s)	40			
examination forms, final grade consists of	form: 2 written examinations (100%, admission: having successfully solved 50% of the practice tasks)			
form of the module-component retake examination	written examination			
form of the module retake examination				
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-04	Physics for Scientists	1st semester	6 CP
module description	Physics for Scientists		
module code	BLM-04		
faculty / subject / department	faculty 07 / physics / I. department of physics		
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester, Chemistry L3		
module coordinator	Cf. German version		
prerequisites	none		
course aims	<p>Students should...</p> <ul style="list-style-type: none"> • have knowledge of fundamental physical units and laws as well as of physical methodology • be able to discuss natural processes by means of mathematical formulation • be proficient in the secure handling of physical instruments, electricity and ionising radiation • be able to set up and conduct simple physical experiments • can interpret measurement results and depict them in charts 		
content of module	<ul style="list-style-type: none"> • basic physical quantities and derived quantities • error localisation • fundamental physical laws of mechanics, thermodynamics, electricity, radiophysics • structure of matter • a selection of simple experiments on mechanics, acoustics, thermodynamics, optics, electrodynamics, radiation, ionising radiation and its interaction with matter, aggregation states, solutions, osmotic pressure, hydrostatics of fluids and gases, gaseous mixtures, diffusion, energy and entropy 		
forms of instruction	lecture (3 h / week), laboratory course (1.3 h / week)		
workload in total (h)	180	Credit Points: 6 CP	
consisting of A courses	lecture	laboratory course	
Aa contact hours	45	20	
Ab preparation, follow-up	45	40	
B autonomous work			
C module examination(s)	30		
examination forms, final grade consists of	form: 2 module component examinations, both either written or oral examinations (50% each) (admission to the 2 nd examination: all protocols accepted)		
form of the module-component retake examination	written examination		
form of the module retake examination			
frequency , duration in semesters	winter semester, 2 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-05	Biology	1st semester	6 CP
module description	Biology		
module code	BLM-05		
faculty / subject / department	faculty 08 / biology		
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester, Nutrition Science BSc / 1 st semester		
module coordinator	Cf. German version		
prerequisites	none		
course aims	Students should... <ul style="list-style-type: none"> • have command of the fundamentals of botany and zoology • are able to classify and comprehend the botanical and zoological questions arising in their field of expertise 		
content of module	hypothesis on the genesis of life; uratomosphere; evolution structure of the animal and plant cell; cell division; cell-recognition – cell discrimination; mutability; differentiation; inheritance; immunity; sensory cells and sensory organs; conduction of stimulus and impulse; nervous system; hormones; functional morphology of tissues, organs and organ systems; ingestion and digestive system; gas exchange, water balance and salt balance; excretion – secretion; ion absorption; mass transport; autotrophy – heterotrophy; efficiency of syntheses and metabolism of plant and animal; food webs; parasitosis – symbiosis; mode of reproduction and evolution; growth; biological organisation plan of plants and animals; systematics of flora and animalia		
forms of instruction	lecture (4 h / week) and practice tasks		
workload in total (h)	180	Credit Points: 6 CP	
consisting of A courses	lecture	practice tasks	
Aa contact hours	60		
Ab preparation, follow-up	30	60	
B autonomous work			
C module examination(s)	30		
examination forms, final grade consists of	form: written examination (100%, admission: having successfully solved 50% of the practice tasks)		
form of the module-component retake examination	written examination		
form of the module retake examination			
frequency , duration in semesters	winter semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-06	Basics of EDP		1st semester	3 CP
module description	Basics of EDP			
module code	BLM-06			
faculty / subject / department	faculty 08 / chemistry / physical chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 1 st semester, Chemistry BSc / 1 st semester			
module coordinator	Cf. German version			
prerequisites	none			
course aims	Students should... <ul style="list-style-type: none"> comprehend the manifold possibilities of using the computer as an instrument for the collection of data, calculation, data analysis, data visualisation and data transfer in networks. be able to autonomously complete tasks of these central domains 			
content of module	<ul style="list-style-type: none"> data collection in experiments, using measurement software (e.g. Labview) using the computer for calculation (e.g. Excel, Maple) data analysis and data visualisation (e.g. Origin/Excel) data transfer and data acquisition (internet) 			
forms of instruction	lecture (0.7 h / week), practice course (1.3 h / week)			
workload in total (h)	90		Credit Points: 3 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	10	20		
Ab preparation, follow-up	10	50		
B autonomous work				
C module examination(s)				
examination forms, final grade consists of form of the module-component retake examination form of the module retake examination	form: successful work on the practice tasks (100%) written or oral examination			
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-07	Introduction to Organic Chemistry		2nd semester	6 CP
module description	Introduction to Organic Chemistry			
module code	BLM-07			
faculty / subject / department	faculty 08 / chemistry / organic chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 2 nd semester, Chemistry BSc / 2 nd semester, Adv. Mater. BSc / 2 nd semester			
module coordinator	Cf. German version			
prerequisites	BLM-01, BLM-02			
course aims	<p>Students should...</p> <ul style="list-style-type: none"> comprehend the bond relationship in organic compounds have understood the basic principles of the properties and chemistry of different functional groups have knowledge of the most important substance and natural product groups possess a basic comprehension of organic-chemical reactions 			
content of module	<ul style="list-style-type: none"> basic concepts of spectroscopy organic molecules: chemistry of the functional groups and their fundamental reaction mechanisms: alkanes, alkenes, alkynes, ether, aldehydes, ketones, carboxylic acids and their derivatives, aromaticity structure of selected natural products (sugars, peptides, fats) Organic-chemical radical reactions, nucleophilic substitution/elimination, electrophilic addition and substitution, tautomerism basic concepts of stereochemistry theoretical organic chemical fundamentals (energy hyper surfaces, molecular orbital theory, effects of solvents, pericyclic reactions, reactivity-selectivity principle, substituent effects, rearrangement reactions) consolidating the substance chemistry of the functional groups in organic chemistry (aldol reactions, acetals, imines, enamines, Michael reaction, condensation and splitting reactions) further mechanisms of organic reactions simple organic syntheses simple organic polymers 			
forms of instruction	lecture (4 h / week), practice course (1 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	60	15		
Ab preparation, follow-up	36	45		
B autonomous work				
C module examination(s)	26			
examination forms, final grade consists of form of the module-component retake examination form of the module retake examination	<p>form: written examination (100%) (admission to the examination: having solved 50% of the practice tasks)</p> <p>written examination</p>			
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the	30			

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courses	
language	German

advice on the module: see notice board **date:** see course catalogue **reading list:** see notice board

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BLM-08	Analytical Chemistry I		2nd semester	6 CP
module description	Analytical Chemistry I			
module code	BLM-08			
faculty / subject / department	faculty 08 / chemistry / organic chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 2 nd semester, Chemistry BSc / 2 nd semester			
module coordinator	Cf. German version			
prerequisites	BLM-01, BLM-02			
course aims	Students should ... <ul style="list-style-type: none"> • acquire the fundamentals of chemical analytics and the basic concepts of the entire analytical process, • acquire the principles of analytical quality assurance, • become familiar with simple methods of separation and enrichment, • acquire knowledge of classical methods for determination. 			
content of module	<ul style="list-style-type: none"> • aims of analytical chemistry • analytical processes: taking samples, preparing samples, measurement, evaluation • sensitivity, detection limit, selectivity, precision/accuracy • main, minor and trace constituents, micro- and trace analysis , environmental analytics • analytical strategies • quality control and quality assurance • extraction, precipitation, thermal methods • gravimetry, titrimetry • electrochemical techniques: potentiometry, polarography, cyclical voltammetry, conductometry • technical aspects of instrumental analytics 			
forms of instruction	lecture (2 h / week), practice course (0.9 h / week), laboratory course (2 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	practice course	laboratory course	
Aa contact hours	30	14	30	
Ab preparation, follow-up	12	42	30	
B autonomous work				
C module examination(s)	22			
examination forms, final grade consists of	form: written examination (100%)			
form of the module-component retake examination	written examination			
form of the module retake examination				
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

BLM-09	Physical Chemistry I	2nd semester	10 CP
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module description	Physical Chemistry I			
module code	BLM-09			
faculty / subject / department	faculty 08 / chemistry / physical chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 2 nd semester, Chemistry BSc / 2 nd semester, Adv. Mater. BSc / 2 nd semester			
module coordinator	Cf. German version			
prerequisites	BLM-01, BLM-03, BLM-04			
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • have mastered fundamental laws in the field of chemical thermodynamics and electrochemistry • be familiar with the physical-chemical approaches of these two fields, as they play an important role in materials science. They should additionally be able to apply this knowledge to neighbouring fields 			
content of module	<ul style="list-style-type: none"> • essential topics of the core areas of physical chemistry (quantum chemistry, composition of matter, thermodynamics incl. statistical fundamentals, electrochemistry, chemical kinetics) • topics of “composition of matter/quantum chemistry” are, amongst others: states of aggregation, equations of state, the Schrödinger equation and energy values as basis for statistical calculations • topics of “chemical thermodynamics” are, amongst others: laws of thermodynamics, Gibbs free energy, entropy, Boltzmann statistics, Maxwell-Boltzmann distribution, partition functions, heat capacity, chemical equilibrium • topics of “chemical kinetics” are, amongst others: formal kinetic rates, simple reaction rate constant theories, half lives, experimental methods, temperature dependence of reaction rates • topics of “electrochemistry”: electrolytes, theory of electrolytes, double layers, galvanic cells, Nernst equation, electrochemical series 			
forms of instruction	lecture (4 h / week), practice course (2 h / week), seminar (0.5 h / week), laboratory course (2.4 h / week)			
workload in total (h)	300		Credit Points: 10 CP	
consisting of A courses	lecture	practice course	seminar	laboratory course
Aa contact hours	60	30	8	36
Ab preparation, follow-up	36	60	12	36
B autonomous work				
C module examination(s)	22			
examination forms, final grade consists of	form: written examination or oral examination(100%) (admission to the examination: having solved 50% of the practice tasks, all protocols accepted, having given a seminar paper)			
form of the module-component	written or oral examination			
retake examination				
form of the module retake examination				
frequency, duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-10	Chemistry of Natural Product Classes		2nd semester	5 CP
module description	Chemistry of Natural Product Classes			
module code	BLM-10			
faculty / subject / department	faculty 08 / chemistry / organic chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 2 nd semester			
module coordinator	Cf. German version			
prerequisites	BLM-01, BLM-02			
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • have knowledge of the most important natural product classes, • have knowledge of the reactivity of these compounds, • have knowledge of the occurrence of these compounds in foodstuffs, • conduct basic reactions with these compounds, • be proficient in setting up chemical reaction apparatus, • have gathered experience with the analysis, synthesis and purification of simple derivatives of the natural products classes • have knowledge of the reactivity of natural products. 			
content of module	<ul style="list-style-type: none"> • practical chemical experiments on natural product classes and foodstuff components • basic chemical operations (e.g. titration, filtration, distillation, extraction) • preparation of simple chemical compounds from natural products • isolating natural products from foodstuffs • practice tasks on chemistry and reactivity of natural products 			
forms of instruction	seminar (0.6 h / week), practice course (0.4 h / week), laboratory course (5.1 h / week)			
workload in total (h)	150		Credit Points: 5 CP	
consisting of A courses	seminar	practice course	laboratory course	
Aa contact hours	8	6	72	
Ab preparation, follow-up	8	12	24	
B autonomous work				
C module examination(s)	20			
examination forms, final grade consists of	form: written examination or oral examination (100%) (admission to the examination: having successfully completed the laboratory course, all protocols accepted, having solved 50% of the practice tasks)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-11	Toxicology and Environmental Law	2nd semester	2 CP
module description	Toxicology and Environmental Law		
module code	BLM-11		
faculty / subject / department	faculty 11 / centre for ecology / industrial medicine		
applies to degree courses / semesters	Food Chemistry BSc / 2 nd semester, Chemistry BSc / 2 nd semester		
module coordinator	Cf. German version		
prerequisites	none		
course aims	<p>Students should ...</p> <p><u>in the environmental law component:</u></p> <ul style="list-style-type: none"> • acquire familiarity with the essential legal regulations on handling hazardous substances. • develop an understanding for the conflicting legally protected rights in hazardous substances legislation (especially fundamental rights and health and environment protection). • attain the competence necessary for a certificate of proficiency. • be enabled to adapt to changing legal regulations in their later professional life by means of an education with a focus on practical knowledge. • have knowledge of fundamental regulations of food law <p><u>in the toxicology component:</u></p> <ul style="list-style-type: none"> • become familiar with toxicological fundamentals and areas of responsibility. • be instructed on the sources and forms of possible exposures. • toxicodynamic and toxicokinetic processes. • comprehend mechanisms of toxic effects; • be taught basic knowledge of the mechanisms of action of selected substances and selected substance classes ; • be able to apply basic knowledge of risk assessment. 		
content of module	<p><u>in the environmental law component:</u></p> <ul style="list-style-type: none"> • the legally prescribed content required for attaining a certificate of proficiency, especially: • regulations on the registration of hazardous substances • regulations on the classification, labelling and packaging of hazardous substances • regulations on the sale and handling of hazardous substances • main features of hazardous substances legislation in a broader sense • basic knowledge of questions concerning relevant constitutional and administrative legislation • connections to European Union law • basic competences in comprehending legal texts • basic knowledge on gathering legal information • fundamentals of food law <p><u>in the toxicology component:</u></p> <ul style="list-style-type: none"> • definition of toxicology and its fields of responsibility; • composition, structure and function of organs as well as cellular and organic possibilities of incorporation; • acute and chronic toxicity; dose-effect relationship; • resorption, distribution, storage, metabolism and secretion of xenobiotics; • principles of toxic effects and chemical cancerogenesis (difference of cumulative poisons and concentration poisons); • characteristic effects of selected substances/substances classes such as solvents, environmental toxins, metals or pesticides. • combination effects, by the example of tobacco smoke • risk assessment on the basis of MAK, TRK and BAT values 		
forms of instruction	lecture legal knowledge (1 h / week), lecture toxicology (1 h / week)		
workload in total (h)	60	Credit Points: 2 CP	
consisting of	lecture legal	lecture toxicology	

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A courses	knowledge			
Aa contact hours	14	15		
Ab preparation, follow-up	6	7		
B autonomous work				
C module examination(s)	18			
examination forms, final grade consists of	form: 2 written or oral examinations (50% each)			
form of the module-component retake examination	written or oral examinations			
form of the module retake examination				
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-12	Analytical Chemistry II		3rd semester	7 CP
module description	Analytical Chemistry II			
module code	BLM-12			
faculty / subject / department	faculty 08 / chemistry / analytical chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 3 rd semester, Chemistry BSc / 3 rd semester			
module coordinator	Cf. German version			
prerequisites	BLM-08			
course aims	Students should ... <ul style="list-style-type: none"> • become acquainted with current methods of separation and enrichment, • learn spectroscopic and spectrometric determination methods, • become acquainted with methods for surface analysis, radioanalytical analysis, enzymatic analysis and immunochemical analysis, • learn chemometric methods of evaluation, • learn current methods of quality assurance. 			
content of module	<ul style="list-style-type: none"> • liquid and gas chromatography • micro, capillary and nano HPLC • electrophoretic methods • spectroscopy and spectrometry of atoms and molecules: photometry, UV/Vis/NIR, IR, Raman, AAS, AES, emission and fluorescence spectrometry, NMR, MS • methods of surface analysis • methods of radioanalytical analysis • enzymatic analysis and immunochemical methods • chemometrics and statistical assessment of data • univariate and multivariate calibration • validation, accreditation • the ISO 9000 and EN 45000 standards 			
forms of instruction	lecture (2 h / week), practice course (0.9 h / week), laboratory course (2.9 h / week)			
workload in total (h)	210	Credit Points: 7 CP		
consisting of A courses	lecture	practice course	laboratory course	
Aa contact hours	30	14	44	
Ab preparation, follow-up	12	42	44	
B autonomous work				
C module examination(s)	24			
examination forms, final grade consists of	form: written examinations (100%)			
form of the module-component retake examination form of the module retake examination	written or oral examination			
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

BLM-13	Reaction Mechanisms	3rd semester	6 CP
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module description	Reaction Mechanisms and Reaction Dynamics		
module code	BLM-13		
faculty / subject / department	faculty 08 / chemistry / organic chemistry		
applies to degree courses / semesters	Food Chemistry BSc / 3 rd semester		
module coordinator	Cf. German version		
prerequisites	BLM-07, BLM-10		
course aims	Students should ... <ul style="list-style-type: none"> comprehend organic chemical reactions mechanisms and methods for their elucidation 		
content of module	<ul style="list-style-type: none"> fundamental mechanistic examinations: methods, catalysis, kinetics, reaction profiles, equilibriums, frontier orbitals fundamental organic reaction mechanisms and reactive intermediate stages reactivity and selectivity, kinetic and thermodynamic control of reactions important name reactions the principle of stereoselective reactions and enantioselective catalyses (Sharpless epoxidation and bishydroxylation) carbonyl chemistry rearrangements redox reactions amino acids and proteins, syntheses 		
forms of instruction	lecture (2.8 h / week), practice course (1.9 h / week)		
workload in total (h)	180		Credit Points: 6 CP
consisting of A courses	lecture	practice course	
Aa contact hours	42	28	
Ab preparation, follow-up	42	56	
B autonomous work			
C module examination(s)	12		
examination forms, final grade consists of	form: written or oral examination (prerequisite: having solved 50% of the practice tasks)		
form of the module-component retake examination	written or oral examination		
form of the module retake examination			
frequency, duration in semesters	winter semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

BLM-14	Organic Chemical Laboratory Course	3rd semester	9 CP
module description	Organic Chemical Laboratory Course		
module code	BLM-14		
faculty / subject / department	faculty 08 / chemistry / organic chemistry		
applies to degree courses / semesters	Chemistry BSc / 3 rd semester		
module coordinator	Cf. German version		
prerequisites	BLM-07, BLM-10		
course aims	Students should ... <ul style="list-style-type: none"> • acquire the fundamentals of preparative organic chemistry in the wet laboratory also using the example of foodstuff components • be proficient in securely setting up organic chemical apparatus • have mastered organic chemical methods of separation and purification • be proficient in aspects of safety at work 		
content of module	<ul style="list-style-type: none"> • organic chemical basic operations • preparation of simple chemical compounds • separation methods, also depending on possible by-products • reaction control, avoiding side reactions • simple organic chemical structure elucidation 		
forms of instruction	seminar (0.8 h / week), laboratory course (12.4 h / week)		
workload in total (h)	270	Credit Points: 9 CP	
consisting of A courses	seminar		laboratory course
Aa contact hours	12		173
Ab preparation, follow-up	12		57
B autonomous work			
C module examination(s)	16		
examination forms, final grade consists of	form: written or oral examinations (prerequisite: successful completion of the laboratory course)		
form of the module-component retake examination	written or oral examination		
form of the module retake examination			
frequency , duration in semesters	winter semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

BLM-15	Physical Chemistry II		3rd semester	8 CP
module description	Physical Chemistry: Consolidation			
module code	BLM-15			
faculty / subject / department	faculty 08 / chemistry / physical chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 3 rd semester			
module coordinator	Cf. German version			
prerequisites	BLM-09			
course aims	Students should ... <ul style="list-style-type: none"> comprehend chemical equilibriums and phase equilibriums, understand the physical chemical foundations of spectroscopic methods and apply that knowledge comprehend the reaction kinetics of complex reactions 			
content of module	<ul style="list-style-type: none"> thermodynamics of mixed phases: binary liquid and solid mixtures, phase diagrams; fundamentals of interface thermodynamics quantum mechanics and spectroscopy: interaction of electromagnetic radiation and molecules; simple quantum mechanical systems; electron spectroscopy of molecules: Franck-Condon-principle; fundamentals of IR, UV-Vis, AS and NMR spectroscopy reaction kinetics of complex reactions (e.g. pre-equilibrium reactions, radical reactions, successive and concurrent reactions, fundamentals of homogeneous and heterogeneous catalysis, enzyme kinetics) 			
forms of instruction	lecture (4 h / week), practice course (2 h / week)			
workload in total (h)	240		Credit Points: 8 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	60	30		
Ab preparation, follow-up	60	60		
B autonomous work				
C module examination(s)	30			
examination forms, final grade consists of	form: written examination (100% admission: having successfully solved 50% of the practice tasks)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-16	Food Chemistry I			4th semester	9 CP
module description	Food Chemistry I				
module code	BLM-16				
faculty / subject / department	faculty 08 / chemistry / department of food chemistry				
applies to degree courses / semesters	Food Chemistry BSc				
module coordinator	Cf. German version				
prerequisites	BLM-07 BLM-10				
course aims	Students should ... <ul style="list-style-type: none"> • acquire basic knowledge of food constituents, additives and flavours, • know chemical reactions that may occur when storing or processing foodstuffs • have knowledge of the fundamentals of food technology • comprehend taste and flavour and know different flavours • be proficient in the basics of laboratory work in food chemistry 				
content of module	<ul style="list-style-type: none"> • food constituents • flavours and structure-effect relationship • food additives • fundamentals of food technology • chemical reactions of and in foodstuffs 				
forms of instruction	lecture (2.9 h / week), seminar (0.9 h / week), practice course (0.9 h / week), laboratory course (2.7 h / week)				
workload in total (h)	270			Credit Points: 9 CP	
consisting of A courses	lecture	seminar	practice course	laboratory course	
Aa contact hours	43	14	14	40	
Ab preparation, follow-up	43	28	28	40	
B autonomous work					
C module examination(s)	20				
examination forms, final grade consists of	form: written or oral examination (100%; admission: having solved 50% of the practice tasks, successful completion of the laboratory course)				
form of the module-component retake examination	written or oral examination				
form of the module retake examination					
frequency , duration in semesters	summer semester, 1 semester				
intake capacity of the courses	30				
language	German				

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Suggestions for the elective module can be found at the end of the module guide. Students must attend one or more of the offered elective courses for a total value of 6 CP. For this purpose, all courses at JLU, both interdisciplinary courses and courses of individual faculties are available.

BLM-17	Elective Module	4th semester	6 CP
module description			
module code	BLM-17		
faculty / subject / department			
applies to degree courses / semesters			
module coordinator			
prerequisites			
course aims	•		
content of module	•		
forms of instruction			
workload in total (h)			
consisting of			
A courses			
Aa contact hours			
Ab preparation, follow-up			
B autonomous work			
C module examination(s)			
examination forms, final grade consists of			
form of the module-component retake examination			
form of the module retake examination			
frequency , duration in semesters	summer semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

BLM-18	Characterisation of Organic Molecules		4th semester	6 CP
module description	Synthesis, Isolation and Characterisation of Organic Molecules			
module code	BLM-18			
faculty / subject / department	faculty 08 / chemistry / department of organic chemistry			
applies to degree courses / semesters	Food Chemistry BSc / 4 th semester			
module coordinator	Cf. German version			
prerequisites	BLM-13			
course aims	Students should ... <ul style="list-style-type: none"> • learn advanced preparative-organic basic operations • acquire the ability to interpret spectroscopic data of organic-chemical compounds • comprehend complex organic-chemical reaction mechanisms • be proficient in workplace safety • practise in giving presentations 			
content of module	<ul style="list-style-type: none"> • advanced fundamentals of the experimental methods of organic chemistry, basic reaction types, organometallic reactions, working under an inert-gas atmosphere, applied preparative chromatography, photochemistry, stereoselective synthesis • spectroscopy of organic molecules: NMR, IR, UV/Vis spectroscopy, mass spectrometry, preparing samples, measurement and interpretation • practice tasks on spectroscopy • observation of organic-chemical reaction mechanisms • presenting selected topics of organic chemistry by giving a paper in the seminar (20-30 min.) 			
forms of instruction	lecture (1 h / week), laboratory course (4.3 h / week), practice course (0.5 h / week), seminar (0.8 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	laboratory course	practice course	seminar
Aa contact hours	14	60	7	11
Ab preparation, follow-up	14	20	14	22
B autonomous work				
C module examination(s)	18			
examination forms, final grade consists of	form: written or oral examination (100%) (admission to the examination: completing the laboratory course, having solved 50% of the practice tasks, successful seminar paper)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	* please see the separate list for the current semester			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

BLM-19	Biochemistry I	4th semester	3 CP
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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

module description	Biochemistry I		
module code	BLM-19		
faculty / subject / department	faculty 08 / biology / department of biology		
applies to degree courses / semesters	Chemistry BSc, Food Chemistry BSc / 4 th semester		
module coordinator	Cf. German version		
prerequisites	BLM-04, BLM-08, BLM-12		
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • get to know the important substance classes (amino acids, proteins, carbohydrates, lipids, nucleic acids), their biochemical composition, their properties and functions, • become familiar with the biosynthesis of biologically important macromolecules, • learn to comprehend the main features of metabolism, • get to know the important methods of biochemistry in theory, and master their practical application (enzyme kinetics, chromatography, centrifugation, PCR) 		
content of module	<ul style="list-style-type: none"> • composition, structure and properties of amino acids, peptides and proteins • composition, structure and properties of sugars, oligosaccharides and polysaccharides • composition, structure and properties of fatty acids, neutral fats and phospholipids • composition, structure and properties of nucleobases, nucleotides and nucleic acids • principles of enzymatic catalysis • biosynthesis of proteins and nucleic acids • main features of metabolism and its regulation • methods of biochemistry (enzyme kinetics, separation of proteins and nucleic acids by means of gel electrophoresis, gel permeation chromatography, ion exchange chromatography and affinity chromatography, centrifugation, PCR): introduction to their theoretical basis and experimental application 		
forms of instruction	lecture (0.9 h / week), laboratory course (1.1 h / week), tutorial (0.3 h / week)		
workload in total (h)	90	Credit Points: 3 CP	
consisting of A courses	lecture	laboratory course	tutorial
Aa contact hours	13	16	4
Ab preparation, follow-up	13	20	14
B autonomous work			
C module examination(s)	11		
examination forms, final grade consists of	form: written examination (100%)		
form of the module-component retake examination form of the module retake examination	written examination		
frequency, duration in semesters	summer semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

BLM-20	Food Microbiology	4th semester	6 CP
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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

module description	Introduction to Food Microbiology		
module code	BLM-20		
faculty / subject / department	faculty 09 / agricultural sciences, nutritional sciences and environmental management / institute for applied microbiology		
applies to degree courses / semesters	Nutrition Sciences BSc / Food Chemistry BSc / 4 th semester		
module coordinator	Cf. German version		
prerequisites	BLM-05, BLM-07, BLM-10		
course aims	Students should ... <ul style="list-style-type: none"> • have knowledge of the fundamentals of food microbiology and food hygiene, of fundamental microbiological methods for the detection of bacteria, especially germs • have fundamental knowledge of food preservation and quality control 		
content of module	<ul style="list-style-type: none"> • role of microorganisms in foodstuffs, factors that influence the occurrence of microorganisms in foodstuffs, keeping quality and spoilage, fundamentals of food fermentation, food hygiene, means of control • fundamentals of sterile working, quantification and identification of bacteria and fungi • essential differences and role of groups of bacteria and fungi (lactobacillus, actinomycetales; spore-producing structures, yeast, fungi imperfecti) in food microbiology • germs • food preservation, conservation • strategies for food biosafety 		
forms of instruction	lecture (4 h / week)		
workload in total (h)	180	Credit Points: 6 CP	
consisting of A courses	lecture		
Aa contact hours	60		
Ab preparation, follow-up	90		
B autonomous work			
C module examination(s)	30		
examination forms, final grade consists of	form: written or oral examination (100%)		
form of the module-component retake examination	written or oral examination		
form of the module retake examination			
frequency, duration in semesters	summer semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-21	Food Chemistry II			5th semester	8 CP
module description	Food Chemistry II				
module code	BLM-21				
faculty / subject / department	faculty 08 / chemistry / institute for food chemistry				
applies to degree courses / semesters	Food Chemistry BSc / 5 th semester				
module coordinator	Cf. German version				
prerequisites	BLM-16				
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • know and apply methods for the analysis of foodstuffs and their constituents • have knowledge of methods for the efficient quality control of foodstuffs • comprehend chemical processes in foodstuffs and know in which processes of food technology they occur • know and apply manufacturing methods of food additives • understand the fundamental operative mechanisms of food additives and flavours • be able to adequately present experimental findings in writing 				
content of module	<ul style="list-style-type: none"> • preparing foodstuffs for analysis • analysing the constituents of foodstuffs (including trace analysis), e.g. using HPLC, GC, FPLC and MS techniques • taste receptors • structure-effect relationships • food technology • chemical reactions during the processing and storing of foodstuffs 				
forms of instruction	lecture (1.9 h / week), practice course (0.9 h / week), laboratory course (4 h / week)				
workload in total (h)	240			Credit Points: 8 CP	
consisting of A courses	lecture	practice course	laboratory course		
Aa contact hours	28	13	60		
Ab preparation, follow-up	28	26	60		
B autonomous work					
C module examination(s)	25				
examination forms, final grade consists of	form: written or oral examination (100%) (admission to the examination: having completed the laboratory course, all protocols, having solved 50% of the practice tasks)				
form of the module-component retake examination	grade: written or oral examination				
form of the module retake examination					
frequency , duration in semesters	winter semester, 1 semester				
intake capacity of the courses	30				
language	* please see the separate list for the current semester				

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-22	Vegetable Foods	5th semester	6 CP
module description	Vegetable Foods		
module code	BLM-22		
faculty / subject / department	faculty 09 / agricultural sciences, nutrition sciences and environmental management / institute for nutritional science and institute for agronomy and plant breeding I		
applies to degree courses / semesters	Nutrition Sciences BSc / Food Chemistry BSc / 5 th semester		
module coordinator	Cf. German version		
prerequisites	none		
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • possess basic knowledge of constituents, quality characteristics and quality requirements of important native unprocessed foodstuffs • have knowledge of the most important groups of foodstuffs, their production from the respective raw vegetable material, their constituents • have knowledge of the significance, the purpose and the technological procedures of treatment and processing • know methods for the elimination of unwanted compounds • have knowledge of the chemical compounds that occur during food processing 		
content of module	<p>Significance, consumption and occurrence of raw vegetable materials, constituents as well as outer and inner quality characteristics of important vegetable foods of native production (bread grains (wheat, rye), brewery grains, raw materials for the production of cereal products, oil plants, edible legumes, potatoes, sacchariferous plants, fruits and vegetables), grains and grain ingredients, bread and baker's yeast, Maillard reaction and mycotoxins, leguminous plants and ingredients, soy products, pectines and other gelling and thickening agents, plant pigments (carotenoids, anthocyanines, betalains), vegetable fats and oils and there treatment and processing (refining, fractionation, hydrogenation, transesterification), margarine manufacture, fat deterioration. Origin, ingredients and technology of luxury foods (coffee, cocoa, tea) and spices (among others vanilla, cinnamon, pepper, curcuma), table vinegar and mustard, foodstuffs gained through alcoholic fermentation (beer, wine), cane and beet sugar, sweeteners</p>		
forms of instruction	lecture (3.2 h / week), practice course (0.8 h / week)		
workload in total (h)	180	Credit Points: 6 CP	
consisting of A courses	lecture	practice course	
Aa contact hours	48	12	
Ab preparation, follow-up	48	48	
B autonomous work			
C module examination(s)	24		
examination forms, final grade consists of form of the module-component retake examination form of the module retake examination	<p>form: written or oral examination (100%) (admission to the examination: having solved 50% of the practice tasks)</p> <p>written or oral examination</p>		
frequency, duration	winter semester, 1 semester		
intake capacity of the courses	30		
language	German		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

BLM-23	Biochemistry II		5th semester	6 CP
module description	Biochemistry II			
module code	BLM-23			
faculty / subject / department	faculty 08 / biology / institute for biochemistry			
applies to degree courses / semesters	Chemistry BSc, Food Chemistry BSc / 5 th semester			
module coordinator	Cf. German version			
prerequisites	BLM-19			
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • become familiar with the detailed structure (chemical constitution, configuration and conformation) of biopolymers and their building blocks • develop a deeper understanding of the various mechanisms of enzymatic catalysis • come to know the processes involved in the major catabolic and anabolic pathways as well as their regulation • learn to understand the molecular details of mechanisms of mass transfer and signal transduction • become familiar with the specific metabolic activities of both single cells and tissue 			
content of module	<ul style="list-style-type: none"> • biochemical evolution • structure and function of proteins and nucleic acids (in detail) • the principles of operation of enzymes, enzyme mechanisms, enzyme kinetics, regulation of enzymes • structure and function of carbohydrates (in detail) • structure and function of lipids (in detail) • biological membranes, membrane transport • biological signal transfer (signal transduction) • carbohydrate metabolism (glycolysis, gluconeogenesis, glycogen metabolism, pentose phosphate pathway) • bioenergetics (citric acid circle, oxidative phosphorylation) • protein turnover and amino acid metabolism • lipid metabolism (fat breakdown, beta oxidation, fatty acid synthesis, phospholipid and cholesterol synthesis) • nucleotide metabolism 			
forms of instruction	lecture (3.4 h / week), seminar (0.7 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	51	10		
Ab preparation, follow-up	68	40		
B autonomous work				
C module examination(s)	11			
examination forms, final grade consists of	form: written examinations (100%)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in	winter semester, 1 semester			

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semesters	
intake capacity of the courses	30
language	German

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-24	Animal Foods		5th semester	5 CP
module description	Biochemistry II			
module code	BLM-24			
faculty / subject / department	faculty 09 / agricultural sciences, nutrition sciences and environmental management			
applies to degree courses / semesters	food sciences BSc, Food Chemistry BSc / 5 th semester			
module coordinator	Cf. German version			
prerequisites	BLM-05			
course aims	Students should ... <ul style="list-style-type: none"> • have knowledge of the biological foundations and processes for the production of foodstuffs from animal origin • have knowledge of factors that influence product quality 			
content of module	<ul style="list-style-type: none"> • production forms and processes of beef, pork, poultry, mutton, goat meat, fish • biological foundations of the quality of products from animal origin • quality factors • the influence of breeding and keeping on product quality • legal framework 			
forms of instruction	lecture (3.7 h / week), practice course (0.3 h / week)			
workload in total (h)	150	Credit Points: 5 CP		
consisting of A courses	lecture	practice course		
Aa contact hours	56	4		
Ab preparation, follow-up	56	12		
B autonomous work				
C module examination(s)	22			
examination forms, final grade consists of	form: written examination (100%)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-25	Molecular Microbiology		5th semester	6 CP
module description	General and Molecular Microbiology			
module code	BLM-25			
faculty / subject / department	faculty 09 / agricultural sciences, nutrition sciences and environmental management			
applies to degree courses / semesters	Nutrition Sciences BSc, Food Chemistry BSc / 5 th semester			
module coordinator	Cf. German version			
prerequisites	none			
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • possess knowledge of the cellular structures of prokaryotes • understand the phylogenetic classification of microorganisms and are able to interpret family trees • gain knowledge of the metabolism diversity of microorganisms • comprehend the growth of microorganisms on a biological and mathematical level • acquire knowledge of the fundamentals of microbial genetics and genetic engineering • gain, in the course of practical tasks, insights into the work techniques and methods in the field of microbiology • come to know various microorganisms in the course of their own work 			
content of module	<ul style="list-style-type: none"> • fundamentals of the composition and function of cellular structures • phylogeny and taxonomy of microorganisms • metabolism of microorganisms: energy production, various respiratory chains, various fermentative metabolisms, photosynthesis, chemoautotrophy • description of the growth of microorganisms • microbial genetics and genetic engineering • introduction to biotechnology • demonstrations of various microbiological techniques and different microorganisms 			
forms of instruction	lecture (4 h / week), practical tasks (2 h / week)			
workload in total (h)	180	Credit Points: 6 CP		
consisting of A courses	lecture	practical tasks		
Aa contact hours	60	30		
Ab preparation, follow-up	30	30		
B autonomous work				
C module examination(s)	30			
examination forms, final grade consists of form of the module-component retake examination form of the module retake examination	<p>form: written examination (100%) (prerequisite: practical tasks)</p> <p>written or oral examination</p>			
frequency , duration in semesters	winter semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-26	Food Chemistry III			6th semester	10 CP
module description	Food Chemistry III				
module code	BLM-26				
faculty / subject / department	faculty 08 / chemistry / institute for food chemistry				
applies to degree courses / semesters	Food Chemistry BSc / 6 th semester				
module coordinator	Cf. German version				
prerequisites	BLM-21				
course aims	<p>Students should ...</p> <ul style="list-style-type: none"> • be proficient in working on issues of food chemistry, practising on laboratory tasks that are frequently worked on in companies/research laboratories • have knowledge of the most recent methods of food chemistry and food analysis as used in research laboratories • have knowledge of regulations and procedures concerning case-specific tasks and issues of food chemistry • present a specific issue, approaches and findings in the form of a seminar paper 				
content of module	<ul style="list-style-type: none"> • practical work on and finding solutions to issues of food chemistry • acquiring new, application-oriented methods • explaining application-oriented issues and approaches to finding a solution in the form of a seminar paper (20-30 min.) • explaining methods and approaches to finding a solution in the lecture 				
forms of instruction	lecture (0.9 h / week), seminar (0.9 h / week), laboratory course (6.7 h / week)				
workload in total (h)	300			Credit Points: 10 CP	
consisting of A courses	lecture	seminar	laboratory course		
Aa contact hours	14	14	100		
Ab preparation, follow-up	14	35	100		
B autonomous work					
C module examination(s)	23				
examination forms, final grade consists of	form: written or oral examination (100%) (admission to the examination: having completed the laboratory course, all protocols, having successfully given the seminar paper)				
form of the module-component retake examination	grade: written or oral examination				
form of the module retake examination					
frequency , duration in semesters	summer semester, 1 semester				
intake capacity of the courses	30				
language	German and English				

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-27	Specialised Botany		6th semester	6 CP
module description	Specialised Botany of Crop Plants			
module code	BLM-27			
faculty / subject / department	faculty 08 / biology			
applies to degree courses / semesters	nutrition sciences BSc, Food Chemistry BSc			
module coordinator	Cf. German version			
prerequisites	none			
course aims	Students should ... <ul style="list-style-type: none"> • possess knowledge of the life processes and life manifestations of plants in interaction with environmental factors • understand the mechanisms plants use to adapt to specific site conditions • be able to describe the chemical and energy flows • can determine plants with the aid of determination keys • know some of the typical species of central European flora • have knowledge of the structure and function of the different plant parts 			
content of module	<ul style="list-style-type: none"> • plants and environments • carbon, mineral and water balance of plants • plants under stress • identifying plants important to agriculture • structure and function of leaf, root and sprout • practice tasks in microscopy 			
forms of instruction	lecture (2 h / week), practice course (2 h / week)			
workload in total (h)	180		Credit Points: 6 CP	
consisting of A courses	lecture	practice course		
Aa contact hours	30	30		
Ab preparation, follow-up	40	60		
B autonomous work				
C module examination(s)	20			
examination forms, final grade consists of	form: written examination (100%) (prerequisite: protocols of the practice tasks)			
form of the module-component retake examination	written or oral examination			
form of the module retake examination				
frequency , duration in semesters	summer semester, 1 semester			
intake capacity of the courses	30			
language	German			

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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BLM-28	Bachelor Thesis	6th semester	12 CP
module description	Bachelor Thesis		
module code	BLM-28		
faculty / subject / department	faculty 08 / chemistry / institute for food chemistry		
applies to degree courses / semesters	Food Chemistry BSc		
module coordinator	Cf. German version		
prerequisites	BLM-1 to BLM-16, BLM-21		
course aims	Students should ... <ul style="list-style-type: none"> • possess the competence to apply scientific methods to a specific task from the field of chemistry, to present their findings as a scientific paper and defend them within the framework of a colloquium 		
content of module	<ul style="list-style-type: none"> • conceiving a work schedule • becoming familiar with the relevant literature • working on possible methods of measurement and evaluation, execution and evaluation, discussing findings • composing the thesis • presentation on the thesis during within the framework of a colloquium 		
forms of instruction	full-time guidance on scientific work in a team of scientists		
workload in total (h)	360	Credit Points: 12 CP	
consisting of A courses	scientific paper		
hours	360		
examination forms, final grade consists of form of the module-component retake examination form of the module retake examination	form: assessment of the thesis		
frequency , duration in semesters	summer semester, 1 semester		
intake capacity of the courses	30		
language	German or English		

advice on the module: see notice board **date**: see course catalogue **reading list**: see notice board

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Elective Modules (BLM 17, examples)

03-BAAB-KOMP	General Competences	3 CP
module description	General Competences	
module code	03-BAAB-KOMP (faculty 03 – extracurricular education BSc – KOMP)	
faculty / subject / department	faculty 03 or others	
applies to degree courses / semesters	Extracurricular Education BSc, Education and Support in Early Childhood BSc	
module coordinator	Cf. German version	
prerequisites	none	
course aims	Students gain... general and extradisciplinary skills that are provided, in joint cooperation and mutual exchange, by the subjects available at Justus Liebig University Gießen.	
content of module	The module “General Competences” is covered by attending one of the modules available at university; said module must be allocated at least 3 CP.	
forms of instruction	varying	
workload in total (h)	90	Credit Points: 6 CP
examination forms, final grade consists of	examination/grade: arithmetic average of the grades received in the individual courses	
form of the module-component retake examination	module-component retake examination: repeating the individual study achievement	
form of the module retake examination	module retake examination: re-taking the module	
frequency , duration in semesters	every year, 2 semester	
intake capacity of the courses	120	
language	German	

advice on the module: see notice board **date:** see course catalogue **reading list:** see notice board

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Medical Chemistry		effort: 6 CP	
	faculty 08 / chemistry		
module coordinator	Cf. German version		
advice on the module	* please see the separate list for the current semester		
instructor	Cf. German version		
course aims	Students should ... <ul style="list-style-type: none"> • acquire knowledge of the fundamentals of medical chemistry • know the process of searching for active ingredients • have command of the molecular causes for selected clinical indications 		
content of module	<ul style="list-style-type: none"> • the process of searching for active ingredients • targets • active ingredients • ingestion, metabolism and excretion of active ingredients • receptors and enzymes • non-classical targets • assays • membranes • structure-effect relationships • multivalency in biological systems 		
forms of instruction	<ul style="list-style-type: none"> • lecture (2 h / week) • practice courses (0.7 h / week) • laboratory course (3.4 h / week) 		
workload in total (h)	lecture		
	contact hours	28 h	
	preparation, follow-up		28 h
	laboratory course		
	contact hours	48 h	
	preparation, follow-up	16 h	
	practice course		
	10 weeks, 1 h each week		10 h
	preparation, follow-up		30 h
	preparation for the examination		18 h
	examination		2 h
	Σ	180 h	
examination forms	written or oral examination (100%)		
requirements			
recommended semester	6 th semester		
module of the degree course	Chemistry BSc		
frequency, duration in semesters	summer semester, 1 semester		
language	German		
intake capacity of the courses / form of registration	30 / internet		
required literature	selected monographs and original articles		

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Stereoselective Synthesis	effort: 6 CP																																																
	faculty 08 / chemistry																																																
module coordinator	Cf. German version																																																
advice on the module	* please see the separate list for the current semester																																																
instructor	Cf. German version																																																
course aims	Students should ... <ul style="list-style-type: none"> comprehend the basic principles of stereoselective synthesis know common chiral auxiliary groups have knowledge of and understand enantioselective catalysis have knowledge of common chiral ligands and catalysts have command of practical methods of enantioselective and stereoselective synthesis as well as of the separation and analysis of resulting products have command of retrosynthetic concepts for the depiction of products that are free of stereoisomers 																																																
content of module	<ul style="list-style-type: none"> models on diastereoselective synthesis: Cram, Felkin-Ahn, Zimmermann-Traxler, active and passive volume Evans-auxiliary, auxiliary groups from natural products, Ender's oximes Bisoxazoline complexes, BINOL complexes, BINAP complexes, Salen complexes and their usage in stereoselective catalysis (incl. mechanisms) biocatalysis, enzymes in organic synthesis Racemat separation Chiral GC and HPLC, ORD using these methods in the laboratory 																																																
forms of instruction	<ul style="list-style-type: none"> seminar (2 h / week) laboratory course (3.4 h / week) practice course (0.7 h / week) 																																																
examination forms	written or oral examination (100%) (admission to the examination: all protocols)																																																
requirements	Conformation and Reactivity																																																
workload in total (h)	<table> <tr> <td>lecture</td> <td></td> <td></td> <td></td> </tr> <tr> <td> contact hours</td> <td></td> <td>28 h</td> <td></td> </tr> <tr> <td> preparation, follow-up</td> <td></td> <td></td> <td>28 h</td> </tr> <tr> <td>laboratory course</td> <td></td> <td></td> <td></td> </tr> <tr> <td> contact hours</td> <td>48 h</td> <td></td> <td></td> </tr> <tr> <td> preparation, follow-up</td> <td></td> <td>16 h</td> <td></td> </tr> <tr> <td>practice course</td> <td></td> <td></td> <td></td> </tr> <tr> <td> 10 weeks, 1 h each week</td> <td></td> <td></td> <td>10 h</td> </tr> <tr> <td> preparation, follow-up</td> <td></td> <td></td> <td>30 h</td> </tr> <tr> <td> preparation for the examination</td> <td></td> <td></td> <td>18 h</td> </tr> <tr> <td> examination</td> <td></td> <td></td> <td>2 h</td> </tr> <tr> <td> Σ</td> <td>180 h</td> <td></td> <td></td> </tr> </table>	lecture				contact hours		28 h		preparation, follow-up			28 h	laboratory course				contact hours	48 h			preparation, follow-up		16 h		practice course				10 weeks, 1 h each week			10 h	preparation, follow-up			30 h	preparation for the examination			18 h	examination			2 h	Σ	180 h		
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