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First-year Core Modules in Oenology (Gießen)

MK 36 – Environmental Chemistry *

MK 57 – Molecular Phytopathology*

MK 59 – Biochemistry in Plant Production *

MK 62 – Biometry and Design of Experiments *

* The module descriptions of the modules refer to the Attachments to the Course and Examination Regulations of Department 09 "Agricultural Sciences, Nutritional Sciences and Environmental Management" (MUG: http://www.uni-giessen.de/cms/mug/7/findex36.html/7_36_09_1_AOeU)

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Second-Year Core Modules in Oenology (Geisenheim)

GM 01 – Technology and Microbiology in Oenology		**3rd sem.**	**6 CP**
Module **description**	Technology and Microbiology in Oenology		
Module **code**	GM 01		
Faculty/Subject/Department	FA Geisenheim/Chair in Microbiology/Microbiology and Biochemistry		
Associated degree course/Semester taken	Oenology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be able to recognise the complex interrelationships between technical and microbiological processes during winemaking and use them to improve quality • have technical and sensory skills in international production processes for white and red wines • have knowledge of the composition and control of microbial populations and enzyme preparations in certain fermentation stages of winemaking and of their influence on important components of wine • be able to produce the best quality products under specific operating conditions in different quality segments		
Module content	• International winemaking practices and wine styles • Flavour formation by microorganisms (de novo synthesis and modification of original grape ingredients) • New international technologies and their legal status • Control of fermentation processes (alcoholic fermentation, malolactic fermentation) and effect of novel enzyme preparations		
Form(s) of instruction	Lectures (50%), and seminars/tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 30, seminars/tutorials 30		
Ab Preparation/revision	30		
B Autonomous work in the module	90		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination and presentations Written examination (90 min.) (50%) and presentations (50%) - Written examination (90 min.)		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German or English		

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GM 02 – Biotechnology and Genetics in Viniculture, Oenology and Beverage Technology		**3rd sem.**	**6 CP**
Module **description**	Biotechnology and Genetics in Viniculture, Oenology and Beverage Technology		
Module **code**	GM 02		
Faculty/Subject/Department	FA Geisenheim/Chair in Microbiology/Microbiology and Biochemistry		
Associated degree course/Semester taken	Oenology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the scientific basis for the characterisation and construction of genetically modified microorganisms and plants compared to conventional breeding techniques • have insight into the safe use of genetically modified organisms, enzymes and agents produced from genetically modified organisms, and into the legal situation and the changes in the previous technical procedures and final products • have knowledge of the meaning and application techniques of enzymes in the food industry		
Module content	• Techniques for characterisation and production of recombinant microorganisms and plants • Analytical characterisation of products created with modified organisms • Biotechnology production and purification processes • Production, purification and use of enzymes • Enzyme kinetics		
Form(s) of instruction	Lectures (50%) and practical tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 30, tutorials 30		
Ab Preparation/revision	30		
B Autonomous work in the module	90		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination and report Written examination (67%) and report (33%) - Written examination (90 min.)		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 04 – Process Strategies in Viniculture		**4th sem.**	**6 CP**
Module **description**	Process Strategies in Viniculture		
Module **code**	GM 04		
Faculty/Subject/Department	FA Geisenheim/Viniculture		
Associated degree course/Semester taken	Oenology, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the water balance of soil and plants • have knowledge of specific cultivation systems, methods of inventory diagnostics, precision management, site assessment and terroir		
Module content	• Procedures for control of irrigation systems • Procedures for site assessment • Assessment procedures for quality assessment in vineyards • GIS, GPS, automatic revenue recognition, and mapping procedures • Function of various cultivation systems		
Form(s) of instruction	Lectures (50%) and tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	900		
Aa Contact hours	60 of which; lectures 30, tutorials 30		
Ab Preparation/revision	30		
B Autonomous work in the module	90		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination Written examination (100%) - Written examination (90 min.)		
Frequency Duration in semesters	Summer semester, annual 4th semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 06 – Ecophysiology and Problems of Special Nutrition of Vine		**3rd Sem.**	**6 CP**
Module **description**	Ecophysiology and Problems of Special Nutrition of Vine		
Module **code**	GM 06		
Faculty/Subject/Department	Ecophysiology and Problems of Special Nutrition of Vine		
Associated degree course/Semester taken	Oenology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have theoretical knowledge of the ecophysiological and crop yield physiology aspects of perennial crops • have knowledge of specific aspects of nutrition of vine • be familiar with research methods in ecophysiology and crop yield physiology in perennial species • know the basics of stress physiology • have knowledge of source-sink relationships		
Module content	• Nutrition and quality formation in vines • Physiology of ingredient formation • Application of ecophysiological measurement methods • Physiological adaptation reactions to abiotic stress • Importance of source-sink reactions • Modern analytical methods for cultivation control		
Form(s) of instruction	Lectures (75%) and seminars and tutorials (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 45, seminars 15		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination Oral examination (100%) - Oral examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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First-Year Core Modules in Wine Economics (Gießen)

MK 01 – Organisation and Corporate Governance in the Agro-Food Industry *

MK 03 - Applied Econometrics *

MK 45 - Advanced Market Theory *

MK 67 - Economic Development and World Agricultural Markets*

* The module descriptions of the modules refer to the Attachments to the Course and Examination Regulations of Department 09 "Agricultural Sciences, Nutritional Sciences and Environmental Management" (MUG: http://www.uni-giessen.de/cms/mug/7/findex36.html/7_36_09_1_AOeU)

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Second-Year Core Modules in Wine Economics (Geisenheim)

GM 16 – Cooperatives in Wine Economics		**4th sem.**	**6 CP**
Module **description**	Cooperatives in Wine Economics		
Module **code**	GM 16		
Faculty/Subject/Department	FA Geisenheim		
Associated degree course/Semester taken	Viniculture, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	Basic knowledge of business administration and economics		
Learning outcomes	The students will be able to • estimate the strategic effects of cooperation • distinguish various forms of cooperation from each other • understand cooperatives and the cooperative movement in general, and specifically classify their (current and future) significance in and for the national and international wine sector • outline and analyse the special features of cooperative management • independently create solutions to their problems		
Module content	• Theoretical approaches to cooperation • Experiments in the subject of cooperative information sharing and fairness • Cooperative theory and management theory • Cooperative structures in the wine market • Management approaches for cooperatives in general and for wine cooperatives in particular • Comparison of cooperatives between sectors and countries		
Form(s) of instruction	Lectures (30%), seminars with presentations (30%), excursions (40%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 18, seminars with presentations 18, excursions 24		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Presentation with PP presentation, oral examination Presentation (30%), oral examination (70%) - Oral examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German and English		

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GM 18 – Applied Wine Market Research		**4th sem.**	**6 CP**
Module **description**	Applied Wine Market Research		
Module **code**	GM 18		
Faculty/Subject/Department	FA Geisenheim/Economics and Market Research		
Associated degree course/Semester taken	Viniculture, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	MK 03 "Applied Econometrics"		
Learning outcomes	The students will be able to • integrate empirical questions about wine markets into econometric models • design and implement empirical survey concepts for specific problems • evaluate and interpret the collected data using econometric and/or other statistical methods • evaluate results of qualitative and quantitative studies and use them to make action recommendations for the beverage industry		
Module content	• Qualitative and quantitative methods for the wine market • Development of survey concepts for wine consumers • Sampling methods • Statistical analysis using the available software • Graphical presentation of the results and interpretation • Preparation of an article for publication		
Form(s) of instruction	Lectures (30%), tutorials (50%), presentations (20%)		
Workload total in hours	180	**ECTS credit points:** 6	
Module composition:			
A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 18, tutorials 30, presentations 12		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Presentation with PP presentation and defence Presentation 30% and defence 70% - Oral examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German and English		

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GM 21 – Strategic Management in Wine Economics		**3rd sem.**	**6 CP**
Module **description**	Strategic Management in Wine Economics		
Module **code**	GM 21		
Faculty/Subject/Department	FA Geisenheim/Economics and Business Administration		
Associated degree course/Semester taken	Viniculture, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be able to apply methods to analyse the economic environment within the wine industry • be able to use strategic tools for business development • be familiar with the methods for the strategic positioning of a company in the wine industry • be able to develop products and product lines in the wine industry • be able to create a business plan and know the methods of controlling in companies in the wine industry		
Module content	• Market and business environment analysis • Strategy development • Product and product line development • Business planning		
Form(s) of instruction	Seminars (50%), tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; seminars 30, tutorials 30		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written assignment and presentation Written assignment 50%, presentation 50% - Written assignment and presentation		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	18		
Language **of instruction**	German		

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GM 25 – Selected Wine Markets of the World		**3rd sem.**	**6 CP**
Module **description**	Selected Wine Markets of the World		
Module **code**	GM 25		
Faculty/Subject/Department	FA Geisenheim/Business Administration and Market Research		
Associated degree course/Semester taken	Viniculture, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	Basic knowledge of market analysis		
Learning outcomes	The students will be able to • describe the most important wine-producing and wine-consuming countries • delineate selected wine markets based on criteria • analyse wine market developments theoretically and empirically • compare legal frameworks for wine and analyse their economic effects		
Module content	• International wine market • Comparison of international wine law • Root cause analysis of different wine market developments • Commercial structures in international comparisons • Comparison of country and company strategies		
Form(s) of instruction	Lectures (30%), seminars with presentations (30%), excursions (40%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition:			
A Formal instruction total	90		
Aa Contact hours	60		
Ab Preparation/revision	30		
B Autonomous work in the module	90		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Presentation with PP presentation; oral examination Presentation with PP presentation (30%); oral examination (70%) - Oral examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German and English		

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First-year Core Modules in Beverage Technology (Gießen)

MK 32 – Nutrition Science*

MK 53 – Process Technology*

MK 62 – Biometry and Laboratory Practice*

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MK 66 – Chemistry and Analysis of Water		**1st and 3rd sem.**	**6 CP**
Module **description**	Chemistry and Analysis of Water		
Module **code**	MK 66		
Faculty/Subject/Department	08/Chair of Nutrition Chemistry & Food Biotechnology/Department of Nutrition Chemistry & Food Biotechnology, Justus Liebig University; Geisenheim/Wine Analysis and Beverage Research		
Associated degree course/Semester taken	Cf. German version		
Module **coordinator**	Cf. German version		
Lecturers	None		
Prerequisites	The students will be able to • apply quantitative methods to crop production • implement appropriate methods in agronomic experiments • process experimental data using statistics • test hypotheses and determine them with conclusive statistics • assess drinking water, mineral water, waste water and other process water fractions based on physical and chemical parameters		
Learning outcomes	• Chemical and physical parameters of drinking, mineral water and waste water • Theoretical foundations of analytical methods • Legal foundations • Quantitative determination of basic parameters (pH, hardness, aggressivity and mineral content) and of potential contaminants (e.g. cyanide, pesticide, etc.) in the laboratory		
Module content	Lectures (25%)/seminars (42%)/work placement (33%)		
Form(s) of instruction	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	135		
Aa Contact hours	60 of which; lectures 15, seminars 25, work placement 20		
Ab Preparation/revision	75		
B Autonomous work in the module	25		
C Module (final) examination	20		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written or oral examination Written or oral examination (100%) - Written or oral examination		
Frequency Duration in semesters	Winter semester, annual 2 semesters		
Intake **capacity**	15		
Language **of instruction**	German		

Note: The lecture part of the module is held at Justus Liebig University in the 1st semester. The seminar part is held at the Geisenheim Research Institute in the 3rd semester alongside the work placement.

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Second-Year Core Modules in Beverage Technology

GM 22 – Microbiology of Beverage		**3rd sem.**	**6 CP**
Module **description**	Microbiology of Beverage		
Module **code**	GM 22		
Faculty/Subject/Department	FA Geisenheim/Chair in Microbiology/ Microbiology and Biochemistry		
Associated degree course/Semester taken	Beverage Technology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have an in-depth knowledge of the microbiology of beverages • have insight into the use of methods for microbiological production monitoring and quality assurance • have knowledge of important fermentation processes • have knowledge of the interrelationships between microbiological contamination and product degradation and risks		
Module content	• In-depth beverage microbiology • Monitoring of biological operations and quality assurance • Starter cultures • Food hygiene, beverage pests • IFU methods • Fermentation of foods and beverages • Traditional foods • Vinegar production • Microbiological production of organic acids • Enzyme production • Regulation of metabolism • Basic principles of molecular biology • Basic principles of fermentation		
Form(s) of instruction	Lectures (50%), tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	120		
Aa Contact hours	60 of which; lectures 30, tutorials 30		
Ab Preparation/revision	60		
B Autonomous work in the module	30		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination and report Written examination (50%), report (50%) - Written examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 27 – Plant Design and Process Engineering		**3rd sem.**	**6 CP**
Module **description**	Plant Design and Process Engineering		
Module **code**	GM 27		
Faculty/Subject/Department	FA Geisenheim/Chair in Beverage Technology Process Technology		
Associated degree course/Semester taken	Beverage Technology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will be able to • develop a specification book for new plants • design a tender • design and plan plants • determine capacities • determine work-flows and expenses • determine the level of automation with process data acquisition, control and alarm plans • determine the power engineering, environmental and staffing conditions and compare them to the plant design • identify the legal and insurance requirements and integrate them into the planning • practise tendering • compare and evaluate the tenders and • constantly perform cost-effectiveness calculations for the different options and intermediate stages • prepare a "supervisory board" submission and present it		
Module content	• As part of team and project work, for each work group (max. 4 students), plants for the production of beverages are planned and developed into a "supervisory board" submission • The intermediate results of the projects are reported at the seminar on a monthly basis • The "supervisory board" submission is presented and defended before fellow students		
Form(s) of instruction	Lectures (20%), practical tutorials (60%), seminars (20%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 12, practical tutorials 36, seminars 12		
Ab Preparation/revision	30		
B Autonomous work in the module	60 project work in groups		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination and project work Oral examination (50%), project work (50%) - Oral examination (50%), project work (50%)		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German and English		

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GM 28 – Food Safety		**3rd sem.**	**6 CP**
Module **description**	Food Safety		
Module **code**	GM 28		
Faculty/Subject/Department	FA Geisenheim/Chair in Beverage Technology		
Associated degree course/Semester taken	Beverage Technology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be familiar with the statutory and private regulations, including standards, for the safe handling of food • know how to implement the legal requirements in beverage production and evaluate them in the standard way for the industry • be able to apply HACCP • be familiar with the basics of implementing a management system for food safety in the company		
Module content	• EU regulations for foods • ISO 22000 • IFS food • BRC		
Form(s) of instruction	Lectures (50%), seminars (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination Written examination (100%) - Written examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German		

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GM 29 – Food Technology and Process Engineering of Fruit Products		**3rd sem.**	**6 CP**
Module **description**	Food Technology and Process Engineering of Fruit Products		
Module **code**	GM 29		
Faculty/Subject/Department	FA Geisenheim/Wine Analysis and Beverage Research		
Associated degree course/Semester taken	Beverage Technology, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have an in-depth knowledge of process engineering in fruit juice, beverage and beer production • be familiar with alternative preservative methods and drying techniques • have insight into the methods for technical operations monitoring and quality assurance • be able to evaluate new technologies and implement cost accounting for introduction into operations		
Module content	• Alternative non-thermal preservation methods (including high-pressure treatment, electroporation, ultrasound) • Concentration procedures • Deep-freezing techniques • Physical stabilisation methods for drinks and purées, alternative treatment agents and stabilisers • Emulsion technologies and rheology • Techniques for drying fruits and vegetables • Production of fermented alcohol-free beverages • Enzyme technology in the food industry		
Form(s) of instruction	Lectures (75%), laboratory (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	60		
Aa Contact hours	60		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral or written examination Oral or written examination (100%) - Oral or written examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

First-year Profile Modules (Gießen)

* The module descriptions of the modules refer to the Attachments of the Course and Examination Regulations of Department 09 "Agricultural Sciences, Nutritional Sciences and Environmental Management" (MUG:http://www.uni-giessen.de/cms/mug/7/findex36.html/7_36_09_1_AOeU)

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Second-Year Profile Modules (Geisenheim)

GM 07 – Organic Viniculture		**3rd sem.**	**6 CP**
Module **description**	Organic Viniculture		
Module **code**	GM 07		
Faculty/Subject/Department	FA Geisenheim/Organic Viniculture		
Associated degree course/Semester taken	Beverage Technology, Oenology and Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be familiar with the agronomic differences between viticultural farming systems, the international differences and trends and their history • be able to classify the cultivation systems legally • have special in-depth knowledge of the agronomic requirements of organic wine production (cultivation techniques, soil management and fertilisation, phytomedicine) • be familiar with the guidelines for processing, declaration and control of organically produced wines • be able to evaluate organic wine production from an economic perspective		
Module content	• Sustainable production systems • Organic viniculture (EC 2092/91 and German standard) • Organic and biodynamic practices • Legal requirements for cultivation and processing • History of environmentally oriented cultivation methods • Practice of organic viniculture • Implementation methods • Appropriate soil management • Plant protection in organic viniculture • Biological control procedures • Alternative methods of quality evaluation • Economics and marketing		
Form(s) of instruction	Lectures (50%) and seminars and excursions (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 30, seminars and excursions 30		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination and seminar presentation Written examination (50%), seminar presentation (50%) - Written examination (50%), seminar presentation (50%)		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 08 – Phytomedicine in Viniculture		**3rd sem.**	**6 CP**
Module **description**	Phytomedicine in Viniculture		
Module **code**	GM 08		
Faculty/Subject/Department	FA Geisenheim/Phytomedicine		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	Knowledge of the causes of abiotic and biotic damage to crops, and the foundations and the implementation of phytosanitary measures		
Learning outcomes	The students will • be familiar with the key processes that play a role in the colonisation and infection of the vine by phytopathogens and herbivorous insects • be capable of assessing the relationships in the development of resistance phenomena of the vine to harmful organisms as the basis for specific control measures • be familiar with specific diseases and pests of European and non-European wine regions • possess special knowledge of forecasting models • be able to perform phytomedical laboratory tests for the diagnosis and characterisation of pests of vines		
Module content	• Analysis of the interactions between pathogens and herbivorous insects and the vine (host location, colonisation, infection, role of chemical signals, vine defence mechanisms, resistances) • Pests and diseases in European and other wine regions • Methods, use and significance of major experimental methods of diagnosis and detection methods for pathogens at visual, biochemical and protein or DNA levels • Seminar on current issues in vine protection		
Form(s) of instruction	Lectures (30%), laboratory (40%), seminars (30%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 15, work placement 30, seminars 15		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Technical discussion, seminar presentation, work placement report Technical discussion (30%), seminar presentation with written report (30%), work placement report (40%)		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 14 – Special Vine Breeding, Vine Propagation and Genetic Variability		**3rd sem.**	**6 CP**
Module **description**	Special Vine Breeding, Vine Propagation and Genetic Variability		
Module **code**	GM 14		
Faculty/Subject/Department	A Geisenheim/Vine Breeding and Vine Grafting		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have detailed knowledge of vine breeding methods • have knowledge of resistance breeding in scion and rootstock varieties • have knowledge of clonal selection strategies in Germany and other wine-producing countries • know the importance of genetic resources and their conservation options • have knowledge of legislation in variety and planting law • have detailed knowledge of refinement and propagation methods • have knowledge of major international grape varieties, their appearance, characteristics, habitat requirements and distribution		
Module content	• Methods of resistance breeding and clonal selection • Processing techniques of vine propagation and refinement • I-vitro propagation techniques and their application to vine breeding • Legal provisions relating to varieties and seedlings • Internationally important species, their appearance, characteristics, habitat requirements and distribution		
Form(s) of instruction	Lectures (50%) and practical tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 30, tutorials 30		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination Oral examination (100%) - Oral examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 15 – Personal Development and Time Management		**4th sem.**	**6 CP**
Module **description**	Personal Development and Time Management		
Module **code**	GM 15		
Faculty/Subject/Department	FA Geisenheim/Economics and Business Administration		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • learn to evaluate themselves and be able to apply methods of self-management • apply methods of personality analysis • be able to apply methods of time management and self-organisation • gain practical experience in the application of methods of cooperative leadership • train and lead teams • be able to plan and conduct staff discussions		
Module content	• Time management • Personality analysis • Staff leadership • Teamwork		
Form(s) of instruction	Seminars (50%), tutorials (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	180		
Aa Contact hours	60		
Ab Preparation/revision	120		
B Autonomous work in the module			
C Module (final) examination	Contained in Ab		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written assignment and presentation Written assignment (50%), presentation (50%) - Written assignment and presentation		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	18		
Language **of instruction**	German		

GM 17 – IT Systems in the Wine Industry		**4th sem.**	**6 CP**
Module **description**	IT Systems in the Wine Industry		
Module **code**	GM 17		
Faculty/Subject/Department	FA Geisenheim		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	Basic knowledge of business administration (especially accounting and bookkeeping), IT and wine law		
Learning outcomes	The students will be able to • identify the vendors and solutions in the systems on the market for the wine industry • define the different IT systems for the wine industry • in the selection process for a suitable IT system, evaluate the use of performance criteria • prepare and outline requirements and functional specifications • perform data cleaning • estimate the migration and implementation process regarding activities and expenditure • estimate the future requirements for IT systems in the wine industry • perform basic postings in selected IT systems and explain the background to them		
Module content	• Market overview of IT systems in the wine industry • Differences between fully integrated and stand-alone systems • Structures and setup of the systems and individual modules • Sample implementation of a complete selection and migration process		
Form(s) of instruction	Lectures (30%), tutorials on the systems (70%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	100		
Aa Contact hours	80		
Ab Preparation/revision	20		
B Autonomous work in the module	50		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination Oral examination (100%) - Oral examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German		

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GM 19 – Distribution and Logistics for Wine		**3rd sem.**	**6 CP**
Module **description**	Distribution and Logistics for Wine		
Module **code**	GM 19		
Faculty/Subject/Department	FA Geisenheim /Business Administration and Market Research		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	Basic knowledge of marketing		
Learning outcomes	The students will be able to • explain and elaborate alternative distribution and logistics strategies and concepts • perform sales control • analyse trade patterns • perform sales and logistics for wine		
Module content	• Sales concepts for wine in international comparisons • International wine logistics • Control tools in sales • IT in sales and logistics • Supply Chain Management • Efficient Consumer Response Management (ECR)		
Form(s) of instruction	Lectures (30%), seminars with presentations (40%), excursions (30%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	180		
Aa Contact hours	60 of which; lectures 18, seminars with presentations 24, excursions 18		
Ab Preparation/revision	120		
B Autonomous work in the module			
C Module (final) examination	Contained in Ab		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written assignment with PP presentation; oral examination Written assignment with PP presentation (50%); oral examination (50%) - Oral examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German and English		

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GM 24 – Special Beverage Analysis		**4th sem.**	**6 CP**
Module **description**	Special Beverage Analysis		
Module **code**	GM 24		
Faculty/Subject/Department	FA Geisenheim/Wine Analysis and Beverage Research		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the analysis of primary and secondary ingredients of beverages • be familiar with and be able to evaluate modern analytical methods		
Module content	• Automated data acquisition and laboratory information systems • Chromatographic analysis methods • Spectroscopic methods • Sample preparation techniques • Analysis of secondary phytochemicals • Analysis of flavourings		
Form(s) of instruction	Lectures (75%) and practical tutorials (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 45, tutorials 15		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination and report Oral examination (100%) - Oral examination and report		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 26 – Wines of the World		**4th sem.**	**6 CP**
Module **description**	Wines of the World		
Module **code**	GM 26		
Faculty/Subject/Department	FA/Geisenheim/Oenology		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be able to recognise and describe the qualitative and sensory characteristics of wines of different origins • have sensory knowledge in the field of international red and white wines • be able to evaluate and describe the quality potential, ripeness and commercial value of international wines • have detailed knowledge of production conditions (climate, soil, wine laws, structures, markets, etc.) of the wine regions of the world		
Module content	• International red and white wine styles • Special wines (sweet wines, fortified wines, sparkling wines, spirits) • Production conditions of the major wine producing countries		
Form(s) of instruction	Lectures (50%) and sensory seminars (50%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 30, seminars 30		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination and sensory testing Written Examination (65%) and sensory testing (35%) - Written examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

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GM 30 – Beverage Development		**4th sem.**	**6 CP**
Module **description**	Beverage Development		
Module **code**	GM 30		
Faculty/Subject/Department	FA Geisenheim/Wine Analysis and Beverage Research		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the effects and use of beverage ingredients • understand interactions among different ingredients • be able to plan and implement a drink in practice according to a requirement profile, from raw material to finished product • be familiar with appropriate technologies for producing and bottling • be able to select appropriate packaging • be able to declare drinks under current law and offer them as a prize • be familiar with the methods for product optimization and sensory evaluation		
Module content	• Ingredients and their interactions • Preparation of a formulation according to a requirement profile • Optimization of formulations, e.g. acidity, sweetness, flavour) • Mixing out of formulations • Control of the quality and formulation using physical and chemical methods • Test methods to determine shelf life • Sensory evaluation		
Form(s) of instruction	Lectures (25%), practical tutorials (40%), seminars (35%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 15, practical tutorials 24, seminars 21		
Ab Preparation/revision	30		
B Autonomous work in the module	60 project work in groups		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination and project work Oral examination 60%, project work 40% - Oral examination 60%, project work 40%		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German		

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GM 31 – Coffee, Tea and Cocoa		**4th sem.**	**6 CP**
Module **description**	Coffee, Tea and Cocoa		
Module **code**	GM 31		
Faculty/Subject/Department	FA Geisenheim/Chairin Beverage Technology		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (4th)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • be familiar with the cultivation conditions for coffee, tea and cocoa, and will know how to evaluate them • be familiar with the process technology for transportation, cleaning, drying, roasting and grinding, including fermentation, and will be able to choose and evaluate the appropriate technique • be familiar with the typical characteristics of the products and will be able to detect and describe odour and taste problems		
Module content	• Agricultural environment of tropical crops • Process engineering for transportation, storage, fermentation, roasting and grinding • Analysis and sensory description		
Form(s) of instruction	Lectures (75%), tutorials (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written examination Written examination (100%) - Written examination		
Frequency Duration in semesters	Summer semester, annual 1 semester		
Intake **capacity**	20		
Language **of instruction**	German		

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GM 32 – Energy and the Environment		**3rd sem.**	**6 CP**
Module **description**	Energy and the Environment		
Module **code**	GM 32		
Faculty/Subject/Department	FA Geisenheim/Technology		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the equipment and procedures of modern energy technologies • be able to describe the process goals and process optimisations of energy processes • and will be able to select and evaluate the appropriate • technique • be familiar with the typical features and benefits of the various • regenerative energy technologies and will be able to describe the fundamental problems of the global • energy system		
Module content	• Objectives and tasks of energy technology • Legal issues and quality management • Process technology of fossil fuels • Process technology of geothermal heat • Process technology of wind power • Process technology of photovoltaics • Process technology of solar heat • Process technology of water power • Process technology of biogas • Process technology of energy crops		
Form(s) of instruction	Lectures (60%), excursions (15%), seminars (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Written or oral examination Written or oral examination (100%) - Written or oral examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	Unlimited		
Language **of instruction**	German		

GM 33 – Extraction of Secondary Products from Fruits and Vegetables		**3rd sem.**	**6 CP**
Module **description**	Extraction of Secondary Products from Fruits and Vegetables		
Module **code**	GM 33		
Faculty/Subject/Department	FA Geisenheim/Wine Analysis and Beverage Research		
Associated degree course/Semester taken	Beverage Technology, Oenology and the Wine Industry, Master's (3rd)		
Module **coordinator**	Cf. German version		
Lecturers	Cf. German version		
Prerequisites	None		
Learning outcomes	The students will • have knowledge of the significance of secondary ingredients from fruits and vegetables • be familiar with the procedural basis for the enrichment of plant secondary metabolites • be able to obtain secondary metabolite extracts for further use within a value chain • be able to assess the quality of these products by chemical analysis		
Module content	• Interesting species of fruits and vegetables • Extraction of secondary phytochemicals from mash and pomace • Adsorber resin technology • Drying technology • Analysis of plant extracts • Product development in the functional food area		
Form(s) of instruction	Lectures (75%) and practical tutorials (25%)		
Workload total in hours	180	**ECTS credit points:** 6 CP	
Module composition: A Formal instruction total	90		
Aa Contact hours	60 of which; lectures 45, work placement 15		
Ab Preparation/revision	30		
B Autonomous work in the module	60		
C Module (final) examination	30		
Method(s) of assessment and contribution to the final mark Module-component retake examination Module retake examination	Oral examination Oral examination (100%) - Oral examination		
Frequency Duration in semesters	Winter semester, annual 1 semester		
Intake **capacity**	10		
Language **of instruction**	German		