

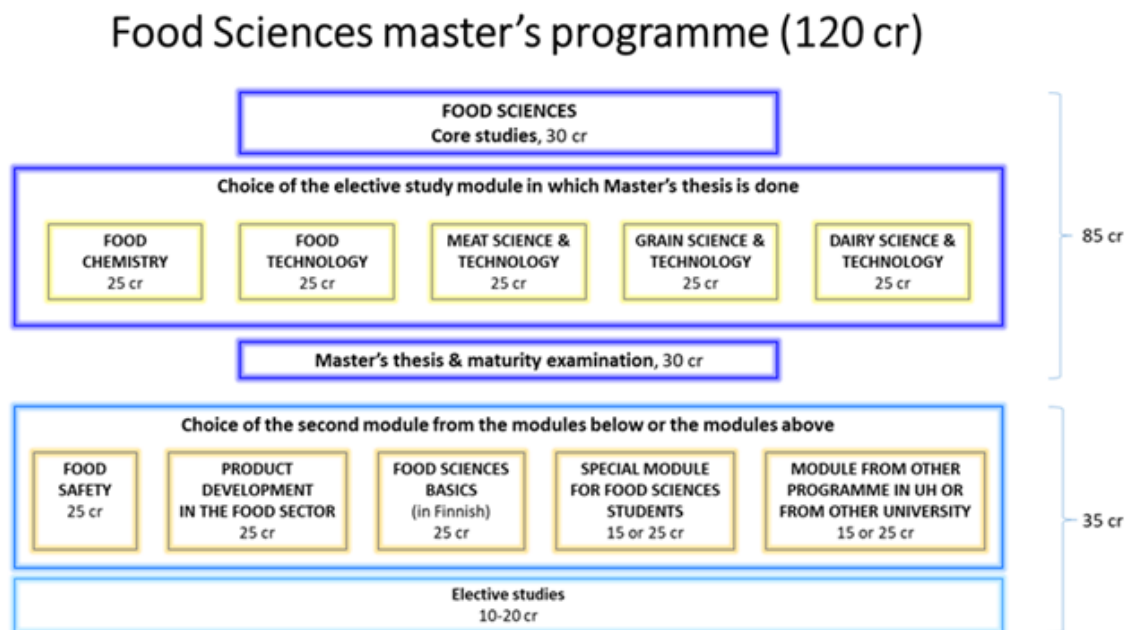
MASTER'S PROGRAMME IN FOOD SCIENCES, CURRICULUM 2020-23, UPDATES FOR 2021-23

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STRUCTURE OF THE MASTER'S PROGRAMME IN FOOD SCIENCES



ADVANCED STUDIES IN FOOD SCIENCES, 85 cr

Advanced studies in Food Sciences include core studies (30 cr) and one of the elective study modules (25 cr) in which Master's thesis (30 cr) is done. The elective study modules are Food Chemistry, Food Technology, Dairy Science and Technology, Grain Science and Technology and Meat Science and Technology.

FOOD-001 Food Sciences core studies, compulsory module, 30 cr

FOOD-101 Food Processing Technology	3
FOOD-102 Food Structure, lectures	3
FOOD-103 Food Additives	5
FOOD-104 Seminars in Food Sciences	3
FOOD-105 Research Exercise in Food Sciences (in the module in which the student will do her/his master's thesis)	6-10
In total 20-24 cr; 6-10 cr from the studies below	

Choice of studies *

FOOD-106 Vitamins and Other Bioactive Substances	5
FOOD-107 Organic Chemistry in Food Sciences *	5
FOOD-108 Organic Structure Analysis *	5
FOOD-109 Food Fermentation and Enzyme Technology	5
FOOD-110 Cereal and Pulse Ingredient Functionality *	2
FOOD-111 Dairy Science and Technology 1 *	2
FOOD-112 Dairy Science and Technology 2 *	2

FOOD-113 Meat Science, lectures *	5
FOOD-115 Practical Training in Food Sciences	2-4
FOOD-116 Advanced Sensory Science	5
FOOD-117 Literature Exam, Sensory Science #	5
FOOD-604 Advanced Lectures in Packaging Technology	2
FOOD-118 Literature Exam, Packaging Technology	3
MMB-302 Food and Environmental Hygiene and Control	5
FOOD-121 Practical Teaching Training	1-10
* prerequisites for specific modules	

only for those who cannot take ETK-240

FOOD-002 Master's thesis, 30 cr and Maturity examination, VIIKM-001, 0 cr

ELECTIVE STUDY MODULES

FOOD-300 Food Chemistry study module , 25 cr

Content

FOOD-305 Chromatographic and Other Separation Techniques in Food Analysis 5 or
KEM331 Separation Techniques (GC&LC)5 (from Kumpula)
FOOD-301 Research in Food Chemistry **2
FOOD-302 Research Methods in Food Chemistry **8
FOOD-303 Literature Exam 1, Food Chemistry 5

Electives

FOOD-120 Working in a Research Group 1-5
FOOD-106 Vitamins and Other Bioactive Substances 5
FOOD-402 Chemical Risk Factors5
FOOD-304 Literature Exam 2, Food Chemistry 5
** mandatory only if the master's thesis done in the study module

Other courses may also be included in the module according to agreement, and as presented in the personal study plan

FOOD-600 Food Technology study module, 25 cr

Content

Electives

FOOD-601 Extrusion 5
FOOD-602 Food Structure, lab work 3
FOOD-603 Packaging Technology, lab work 3
FOOD-604 Advanced Lectures in Packaging Technology 2
FOOD-605 Potential Novel Methods and Technologies 5
FOOD-608 Literature Exam, Food Technology 2-6
FOOD-607 Food Solutions Master Class15
FOOD-109 Food Fermentation and Enzyme Technology 5
FOOD-115 Practical Training in Food Sciences 2-4
FOOD-116 Advanced Sensory Science 5
FOOD-120 Working in a Research Group 1-5

Technology courses from dairy, grain or meat science and technology modules or preceding studies of them can be added max. 5 cr to the module. Other courses may also be included in the module according to agreement, and as presented in the personal study plan.

FOOD-200 Dairy Science and Technology study module, 25 cr

Content

FOOD-201 LAB Starters and Probiotics4
 FOOD-202 Liquid Milk Products 6
 FOOD-203 Solid Milk Products6
 FOOD-204 Literature Exam, Dairy Science and Technology4

Electives

FOOD-120 Working in a Research Group1-5
 FOOD-109 Food Fermentation and Enzyme Technology5
 FOOD-602 Food Structure, lab work3
 FOOD-401 European Food Safety5
 MMB-302 Food and Environmental Hygiene and Control5
 ** mandatory only if the master's thesis done in the study module

FOOD-700 Grain Science and Technology study module, 25 cr

Content

FOOD-701 Food Crop Quality3
 FOOD-702 Cereal Processing5
 FOOD-703 Grain Technology, lab works**5
 FOOD-602 Food Structure, lab work3
 FOOD-704 Literature exam, Grain Science and Technology4

Electives

FOOD-706 Problem-Based Learning in Grain Science and Technology Research5
 FOOD-109 Food Fermentation and Enzyme Technology 5
 FOOD-601 Extrusion5
 FOOD-106 Vitamins and Other Bioactive Substances5
 FOOD-120 Working in a Research Group 1-5
 FOOD-115 Practical Training in Food Sciences 2-4
 ** mandatory only if the master's thesis done in the study module

Courses from dairy or meat science and technology modules or food technology module or preceding studies of them can be added max. 5 cr to the module. Other courses may also be included in the module according to agreement, and as presented in the personal study plan.

FOOD-800 Meat Science and Technology study module, 25 cr

Content

FOOD-801 Meat Technology, lectures5
 FOOD-802 Meat Science, lab work5
 FOOD-803 Meat Technology, processing lab**5
 FOOD-804 Literature Exam, Meat Science and Technology5

Electives

HNFB-111 Anatomian ja fysiologian perusteet 5 (in Finnish, BSc level)
 FOOD-109 Food Fermentation and Enzyme Technology 5
 FOOD-602 Food Structure, lab work 3
 MMB-302 Food and Environmental Hygiene and Control 5
 ** mandatory only if the master's thesis done in the study module

OTHER STUDIES, 35 cr

OPTIONAL SECOND MODULE

FOOD-400 Food Safety study module, 25 cr

Content

FOOD-401 European Food Safety	5
FOOD-402 Chemical Risk Factors	5
FOOD-403 Food Toxicology and Risk Assessment	5
FOOD-404 Literature Exam, Food Safety	5

Electives:

MMB-302 Food and Environmental Hygiene and Control	5
MMB-301 Food Microbiology, book exam *)	5
MMB-303 Food Microbiology, lab course	5
FOOD-109 Food Fermentation and Enzyme Technology	5
Introduction to bioinformatic tools in food hygiene research	2 (veterinary faculty)
ELL-429 Molecular methods for detection of food- and waterborne pathogens	3 (veterinary faculty)

*) Note that ET-231 and MMB-301 are corresponding courses. If you have accomplished ETK-231, it is not possible to get credits of MMB-301 and you have to choose some other elective course.

FOOD-900 Product Development in the Food Sector study module, 25 cr**Content**

For example, the following courses may be included in the Module of 25 cr:

YET-104 Ideasta tuotteeksi - Tuotekehitys elintarvikealalla	5
EE039 Aineopintojen kirjallisuuskulustelu (tuotekehityksen kirjallisuuskulustelu)	5
YET-017 Liiketoimintasuunnitelman laatiminen	5
YET-004 Elintarvikemarkkinoinnin perusteet	5
YET-107 Laatujohtaminen elintarvikealalla	5
EKM-102 Digitaalinen markkinointi	5
ETK-250 Pakkausteknologian perusteet *)	5
FOOD-604 Advanced Lectures in Packaging Technology	2
FOOD-118 Literature Exam, Packaging Technology	3
ETK-240 Aistinvaraisen tutkimuksen perusteet *)	5
FOOD-117 Literature Exam, Sensory Science #)	5
FOOD-116 Advanced Sensory Science	5
ETK-264 Funktionaaliset elintarvikkeet *)	3
FOOD-103 Food Additives	5
ETK-130 Elintarvikelainsäädäntö ja -valvonta *)	5
FOOD-401 European Food Safety	5
FOOD-101 Food Processing Technology	3
FOOD-607 Food Solutions Master Class	15

Other courses, e.g., exchange studies, may also be included in the Module according to prior agreement, and as presented in the personal study plan.

*) these courses belong to BSc studies in Food Sciences

#) only for those who cannot take ETK-240

FOOD-500 Food Sciences Basics study module, 25 cr**Content**

ETK-110 Elintarvikekemian ja -teknologian perusteet	10
ETK-130 Elintarvikelainsäädäntö ja -valvonta	5
	15

Electives:

ETK-210 Elintarvikkeiden fysikaaliset ominaisuudet	5
ETK-225 Elintarvikekemiallinen analytiikka, harjoitustyöt	5
ETK-230 Elintarvikkeiden makrokomponenttien kemia	5
ETK-240 Aistinvaraisen tutkimuksen perusteet	5
ETK-250 Pakkausteknologian perusteet	5
ETK-215 Elintarvikesuunnittelu ja -prosessointi	5
ETK-260 Elintarvikkeiden makrokomponenttien reaktiot ja vuorovaikutukset	5

FOOD-1000 Special module for students in the Food Sciences Master's Programme, 15 or 25 cr

Contents: Courses to be included in the module are according to agreement with the student and the responsible person for the elective study module and as presented in the personal study plan.

Module from other programme in UH or from other university, 15 or 25 cr

ELECTIVE (OPTIONAL) STUDIES, 10-20 cr

MODULE DESCRIPTIONS

Advanced studies in food sciences, 85 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

The module title is determined by the elective study module (25 cr) in which Master's thesis is done:

Advanced studies in Food Chemistry

Advanced studies in Food Technology

Advanced studies in Dairy Science and Technology

Advanced studies in Grain Science and Technology

Advanced studies in Meat Science and Technology

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-030 (Advanced studies in Food Chemistry)

FOOD-060 (Advanced studies in Food Technology)

FOOD-020 (Advanced studies in Dairy Science and Technology)

FOOD-070 (Advanced studies in Grain Science and Technology)

FOOD-080 (Advanced studies in Meat Science and Technology)

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

Compulsory for students in Food Sciences master's programme

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL

EQF-taso 7 / Level 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year of MSc

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS

85 cr

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

FOOD-020 Tapani Alatossava, FOOD-030 Vieno Piironen, FOOD-060 Kirsi Mikkonen, FOOD-070 Kati Katina and FOOD-080 Per Ertbjerg.

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module the student has profound understanding on the key elements and theory of food sciences and on one of the elective modules of food sciences: food chemistry, food technology, dairy science and technology, grain science and technology and meat science and technology. The student is able to critically consider, plan and implement a research project in a timeframe and define appropriate research questions based on a theoretical framework. She/he is able to apply ethical principles in science. She/he can summarize her/his own MSc research, main results and conclusions to a broad audience. She/he can critically assess the research work of others and receive and use feedback in his/her own research and writing. The student is prepared for lifelong learning in the role of an expert in food sciences.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

Bachelor's degree studies in Food Sciences or equivalent completed.

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-001 Core studies in Food Sciences, compulsory module	30	cr
FOOD-002 Master's thesis		30 cr
VIKIM-001 Maturity examination		
One of the elective study modules (25 cr) in which Master's thesis is done:		
FOOD-300 Food chemistry study module	25	cr
FOOD-600 Food Technology study module	25	cr
FOOD-200 Dairy Science and Technology study module	25	cr
FOOD-700 Grain Science and Technology study module	25	cr
FOOD-800 Meat Science and Technology study module	25	cr

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses (excl. Master's thesis)

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

Suomi ja englanti / Finnish and English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

FOOD-001 Core studies in Food Sciences, compulsory module, 30 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Core studies in food sciences

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-001

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

Compulsory for students in Food Sciences master's programme

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL

EQF-taso 7 / Level 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year of MSc

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS

30 cr

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Responsible persons of the advanced studies: FOOD-020 (Tapani Alatossava), FOOD-030 (Vieno Piironen), FOOD-060 (Kirsi Mikkonen), FOOD-070 (Kati Katina) and FOOD-080 (Per Ertbjerg).

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module the student has profound understanding on the key elements and theory of food sciences. She/he has gained chemical and technological knowledge enabling further studies in elective modules of food sciences: dairy science and technology, food chemistry, food technology, grain science and technology and meat science and technology. The student is able to critically consider, plan and implement a research project in a timeframe and define appropriate research questions based on a theoretical framework. She/he is able to apply ethical principles in science

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

Bachelor's degree studies in Food Sciences or equivalent completed or close to the completion

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-101 Food Processing Technology	3
FOOD-102 Food Structure, lectures	3
FOOD-103 Food Additives	5
FOOD-104 Seminars in Food Sciences	3
FOOD-105 Research Exercise in Food Sciences (in the module in which the student will do her/his master's thesis)	6-10
	20-24
<u>Choice of studies *</u>	
FOOD-106 Vitamins and Other Bioactive Substances	5
FOOD-107 Organic Chemistry in Food Sciences *	5
FOOD-108 Organic Structure Analysis *	5
FOOD-109 Food Fermentation and Enzyme Technology	5
FOOD-110 Cereal and Pulse Ingredient Functionality *	2
FOOD-111 Dairy Science and Technology 1 *	2
FOOD-112 Dairy Science and Technology 2 *	2
FOOD-113 Meat Science, lectures *	5
FOOD-115 Practical Training in Food Sciences	2-4
FOOD-116 Advanced Sensory Science	5
FOOD-117 Literature Exam, Sensory Science #	5
FOOD-604 Advanced Lectures in Packaging Technology	2
FOOD-118 Literature Exam, Packaging Technology	3
MMB-302 Food and Environmental Hygiene and Control	5
FOOD-121 Practical Teaching Training	1-10
* prerequisites for specific modules	
# only for those who cannot take ETK-240	

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

Suomi ja englanti / Finnish and English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Entity belongs into the advanced studies and is not registered separately as a study entity.

FOOD-200 Dairy Science and Technology, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Dairy Science and Technology module, Maitotieteen ja -tekniikan moduuli, Modulen I mjölkvetenskap och -teknologi

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-200

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is one of the five optional modules with an option to carry out a master's thesis. The module is available for students in other programme if free places are available and bachelor level knowledge of the student are supportive for the selection.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7**5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION**

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25**7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE**

Tapani Alatossava

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing this module the student understand the biochemical, microbiological and technological features, characteristics and principles, and the manufacture of the most common dairy products. In addition the student is able to understand properties of raw milk as a raw material as well as the most significant microbial tools (LAB starters, secondary cultures and probiotics) and spoilage sources (particularly psychrotrophs and spore-formers) involved in the manufacture and quality control, respectively, of high-quality dairy products.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

BSc studies in Food Sciences or equivalent completed or close to the completion. FOOD-111 Dairy Science and Technology 1 and FOOD-112 Dairy Science and Technology 2 courses (2+2 cr) need to be performed latest at the same study year as the compulsory courses of this module except the literature exam.

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT**Content**

FOOD-201 LAB Starters and Probiotics4

FOOD-202 Liquid Milk Products 6

FOOD-203 Solid Milk Products6

FOOD-204 Literature Exam, Dairy Science and Technology4

Electives

FOOD-120 Working in a Research Group1-5

FOOD-109 Food Fermentation and Enzyme Technology5

FOOD-602 Food Structure, lab work3

FOOD-401 European Food Safety5

MMB-302 Food and Environmental Hygiene and Control5

** mandatory only if the master's thesis done in the study module

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION English**13. LISÄTIEDOT / ADDITIONAL INFORMATION**

Other courses may also be included in the module entity according to prior agreement with the responsible professor. Opintokokonaisuus voidaan suorittaa suomen tai ruotsin kielellä.

FOOD-300 Food Chemistry study module, 25 cr**1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE**

Food Chemistry module, Elintarvikekemian moduuli, Modulen i livsmedelskemi

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-300

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences Master's Programme. The module is one of the five optional modules with an option to carry out a master's thesis. The module is available for students of other programmes with bachelor level knowledge in food sciences.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7**5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION**

1st year and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25**7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE**

Vieno Piironen

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

The student knows chemical structures and properties of food components and has good knowledge on their reactions and interactions in food processing and storage. The student understands structure-functionality relationship of food components and ingredients and is able to carry out structure and quantitative analysis in food chemistry research.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

FOOD-107 Organic Chemistry in Food Sciences 5, FOOD-108 Organic Structure Analysis 5 **

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-305 Chromatographic and Other Separation Techniques in Food Analysis 5 or	
KEM331 Separation Techniques (GC&LC)	5 (from Kumpula)
FOOD-301 Research in Food Chemistry **	2
FOOD-302 Research Methods in Food Chemistry **	8
FOOD-303 Literature Exam 1, Food Chemistry	5

Electives:

FOOD-120 Working in a Research Group	1-5
FOOD-106 Vitamins and Other Bioactive Substances	5
FOOD-402 Chemical Risk Factors	5
FOOD-304 Literature Exam 2, Food Chemistry	5

** mandatory only if the master's thesis is done in the module

Other courses may also be included in the module according to agreement, and as presented in the personal study plan

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted average of the grading of the individual courses in the module.

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement. Opintokokonaisuus voidaan suorittaa suomen tai ruotsin kielellä.

FOOD-400 Food Safety study module, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Food Safety module, Elintarviketurvallisuuden moduuli, Modulen i livsmedelssäkerhet

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-400

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is elective for Food Sciences master's students. The module is available for master's students in other programmes with bachelor level knowledge in food science.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Marina Heinonen

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module the student is familiar with the food safety hazards of both chemical and microbiological in nature, has basic knowledge in food toxicology, and is able to understand the principles of risk assessment and risk management.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREREQUISITES

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10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-401 European Food Safety	5
FOOD-402 Chemical Risk Factors	5
FOOD-403 Food Toxicology and Risk Assessment	5
FOOD-404 Literature Exam, Food Safety	5
Electives:	
MMB-302 Food and Environmental Hygiene and Control	5
MMB-301 Food Microbiology, book exam	5
MMB-303 Food Microbiology, lab course	5
FOOD-109 Food Fermentation and Enzyme Technology	5
Introduction to bioinformatic tools in food hygiene research	2 (veterinary faculty)
ELL-429 Molecular methods for detection of food- and waterborne pathogens	3 (veterinary faculty)

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement

FOOD-500 Food Sciences Basics study module, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Food Sciences Basics, Elintarviketieteiden perusteet, Grundstudier i Livsmedelsvetenskaper

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-500

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is compulsory for those Food Sciences master's students not having bachelor level knowledge in food science. The module is also available for other master's programme students.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7**5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION**

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25**7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE**

Kirsi Jouppila and the Steering Group of the Food Sciences master's programme

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module the student has basic knowledge in food science.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

-

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

ETK-110 Elintarvikekemian ja -tekniikan perusteet	10
ETK-130 Elintarvikelainsäädäntö ja -valvonta	5
	15
Electives:	
ETK-210 Elintarvikkeiden fysikaalinen kemia	5
ETK-225 Elintarvikekemiallinen analytiikka, harjoitustyöt	5
ETK-230 Elintarvikkeiden makrokomponenttien kemia	5
ETK-240 Aistinvaraisen tutkimuksen perusteet	5
ETK-250 Pakkaustekniikan perusteet	5
ETK-215 Elintarvikesuunnittelu ja -prosessointi	5
ETK-260 Elintarvikkeiden makrokomponenttien reaktiot ja vuorovaikutukset	5

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

Finnish

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement

FOOD-600 Food Technology study module, 25 cr**1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE**

Food Technology module, Elintarvike- ja elintarviketekniikan moduuli, Modulen I livsmedelsteknologi

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-600

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is one of the five optional study modules with an option to carry out a master's thesis. The module is available for students of other programmes with bachelor level knowledge in food sciences or equivalent knowledge.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Kirsi Mikkonen

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module the student is familiar with the profound knowledge in the field of Food Technology allowing expertise for research and development tasks in the area and writing master's thesis within Food Technology module.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

Packaging Technology 5 cr (e.g., ETK-250), FOOD-118 Literature Exam 3 cr to compliment existing packaging studies (if under 5 cr) or equivalent knowledge for FOOD-604 and FOOD-603.

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

Electives:

FOOD-601 Extrusion	5
FOOD-602 Food Structure, lab work	3
FOOD-603 Packaging Technology, lab work	3
FOOD-604 Advanced Lectures in Packaging Technology	2
FOOD-605 Potential Novel Methods and Technologies	5
FOOD-608 Literature Exam, Food Technology	2-6
FOOD-607 Food Solutions Master Class	15
FOOD-109 Food Fermentation and Enzyme Technology	5
FOOD-115 Practical Training in Food Sciences	2-4
FOOD-116 Advanced Sensory Science	5
FOOD-120 Working in a Research Group	1-5

Technology courses from dairy, grain or meat science and technology modules or preceding studies of them can be added max. 5 cr to the module. Other courses may also be included in the module according to agreement, and as presented in the personal study plan.

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement. Opintokokonaisuus voidaan suorittaa suomen tai ruotsin kielellä.

FOOD-700 Grain Science and Technology, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Grain Science and Technology module, Viljätieteen ja -teknologian moduuli, Modulen i spannmålsvetenskap och -teknologi

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-700

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is one of the five optional study modules with an option to carry out a master's thesis. The module is available for students of other programmes with bachelor level knowledge in food sciences.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Kati Katina

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completing the module, the student understands the technological and nutritional characteristics of plant-based raw materials and knows how to develop the technologies for their conversion into food products.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

FOOD-110 Cereal and Pulse Ingredient Functionality 2

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-701 Food Crop Quality	3
FOOD-702 Cereal Processing	5
FOOD-703 Grain Technology, lab works**	5
FOOD-602 Food Structure, lab work	3
FOOD-704 Literature exam, Grain Science and Technology	4

Electives:

FOOD-706 Problem-Based Learning in Grain Science and Technology Research	5
FOOD-109 Food Fermentation and Enzyme Technology	5
FOOD-601 Extrusion	5
FOOD-106 Vitamins and Other Bioactive Substances	5
FOOD-120 Working in a Research Group	1-5

** mandatory only if the master's thesis is done in the study module

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement. Opintokokonaisuus voidaan suorittaa suomen tai ruotsin kielellä.

FOOD-800 Meat Science and Technology study module, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Meat Science and Technology module, Lihatiiteen ja -teknologian moduuli, Modulen I köttvetenskap och -teknologi

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-800

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

The responsible programme for the module is the Food Sciences master's programme. The module is one of the five optional modules with an option to carry out a master's thesis. The module is available for students in other programmes with basic knowledge in food science.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Per Erbjerg

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

After completion of the module the students will have a detailed knowledge on fresh meat structure and quality, meat processing and unit operations, as well as meat products and their production.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

FOOD-113 Meat Science, lectures 5

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

FOOD-801 Meat Technology, lectures	5
FOOD-802 Meat Science, lab work	5
FOOD-803 Meat Technology, processing lab**	5
FOOD-804 Literature Exam, Meat Science and Technology	5

Electives:

HNFB-111 Anatomian ja fysiologian perusteet	5 (in Finnish, BSc level)
FOOD-109 Food Fermentation and Enzyme Technology	5
FOOD-602 Food Structure, lab work	3
MMB-302 Food and Environmental Hygiene and Control	5

** mandatory only if the master's thesis is done in the study module

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted mean of the grades of the courses

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Other courses may also be included in the module entity according to prior agreement

FOOD-900 Product Development in the Food Sector study module, 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Product Development in the Food Sector, Tuotekehitys elintarvikealalla, Produktutveckling inom Livsmedelsbranschen

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-900

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

Compulsory/can be chosen from different options: The responsible programme for the module is the Food Sciences master's programme. The module is elective for Food Sciences master's students. The Module is also available for students in "Ympäristö- ja elintarviketalouden kandidaattiohjelma" and for other students with bachelor level knowledge in food science or equivalent knowledge.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st year - 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Anna-Maija Lampi (Food Sciences Master's Programme), Sari Ollila (Ympäristö- ja elintarviketalouden kandidaattiohjelma)

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

The student has a broad view on the product development process in the food sector by understanding its individual steps and the whole product development environment, and by multidisciplinary projects and studies. Depending on the preceding knowledge, the student has a possibility to deepen and broaden the knowledge on economical, marketing, technological, legislation or safety aspects included in the process.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

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10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

Each student should prepare a personal study plan where the courses to be included in the Module are listed, and an agreement on the courses to be included in the Module should be done with one of the responsible teachers before starting the studies.

For example, the following courses may be included in the Module of 25 cr:

YET-104 Ideasta tuotteeksi - Tuotekehitys elintarvikealalla	5
EE039 Aineopintojen kirjallisuuskoulutus (tuotekehityksen kirjallisuuskoulutus)	5
YET-017 Liiketoimintasuunnitelman laatiminen	5
YET-004 Elintarvikemarkkinoinnin perusteet	5
YET-107 Laatujohtaminen elintarvikealalla	5
EKM-102 Digitaalinen markkinointi	5
ETK-250 Pakkausteknologian perusteet *)	5
FOOD-604 Advanced Lectures in Packaging Technology	2
FOOD-118 Literature Exam, Packaging Technology	3
ETK-240 Aistinvaraisen tutkimuksen perusteet *)	5
FOOD-117 Literature Exam, Sensory Science #	5
FOOD-116 Advanced Sensory Science	5
ETK-264 Funktionaaliset elintarvikkeet *)	3
FOOD-103 Food Additives	5
ETK-130 Elintarvikelainsäädäntö ja -valvonta *)	5
FOOD-401 European Food Safety	5
FOOD-101 Food Processing Technology	3
FOOD-607 Food Solutions Master Class	15

Other courses, e.g., exchange studies, may also be included in the Module according to prior agreement, and as presented in the personal study plan.

Please note that

some courses are held only in Finnish

some of the courses may have special preceding studies or restrictions in participation

*) these courses belong to BSc studies in Food Sciences

only for those who cannot take ETK-240

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

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12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English or Finnish

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Part of the courses will be held in Finnish. Other courses may also be included in the Module according to prior agreement.

FOOD-1000 Special module for students in the Food Sciences Master's Programme, 15 or 25 cr

1. OPINTOKOKONAISUUDEN NIMI / MODULE TITLE

Special module for students in the Food Sciences Master's Programme

2. OPINTOKOKONAISUUDEN TUNNISTE / MODULE CODE

FOOD-1000

3. PAKOLLISUUS/VALINNAISUUS / MODULE STATUS: COMPULSORY OR OPTIONAL

Optional for students of the Food Sciences Master's Programme.

4. OPINTOKOKONAISUUDEN TASO / MODULE LEVEL 7

5. OPINTOKOKONAISUUDEN SUOSITELTU SUORITUSAJANKOHTA/ VAIHE / RECOMMENDED TIME/STAGE OF STUDIES FOR COMPLETION

1st year and 2nd year

6. OPINTOKOKONAISUUDEN LAAJUUS OPINTOPISTEINÄ / SCOPE OF MODULE IN CREDITS

15 or 25

7. OPINTOKOKONAISUUDESTA VASTAAVA OPETTAJA / TEACHER COORDINATING THE MODULE

Responsible person for the elective study module in which the student will do her/his master's thesis

8. OPINTOKOKONAISUUDEN OSAAMISTAVOITTEET / MODULE LEARNING OUTCOMES

To support other studies in the programme by learning more in a selected topic of natural sciences, biosciences or food sciences. Special module enables the student to have a more in-depth understanding in the selected topic as well as a better knowledge in its theoretical and technical possibilities which she/he can utilize in her/his further studies and thesis.

9. EDELTÄVÄT OPINNOT tai EDELTÄVÄ OSAAMINEN / PREQUISITES

-

10. OPINTOKOKONAISUUDEN SISÄLTÖ / MODULE CONTENT

Courses to be included in the module are according to agreement with the student and the responsible person for the optional module and as presented in the personal study plan.

11. OPINTOKOKONAISUUDEN ARVOSANAN MUODOSTUMINEN / MODULE GRADING

Weighted average of the grading of the individual courses in the module.

12. OPETUSKIELI / LANGUAGE OF INSTRUCTION

English

13. LISÄTIEDOT / ADDITIONAL INFORMATION

Opintokokonaisuus voidaan suorittaa suomen tai ruotsin kielellä.

Module from other programme in UH or from other university, 15 or 25 cr

A module from other programme that may broaden the knowledge, e.g., in chemistry, economics, microbiology, nutrition, and marketing, or in other relevant field.

COURSE DESCRIPTIONS

FOOD-002 Master's thesis, 30 cr

Name: Master's thesis

Code: FOOD-002

Course status: compulsory or optional: Master's thesis is compulsory for Food Sciences master's students.

Level: 7

Recommended time/stage of studies for completion: 2nd year

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 30

Teacher coordinating the course: Responsible person of the choice of the module: Food Chemistry, Food Technology, Meat Science and Technology, Dairy Science and Technology, or Grain Science and Technology

Learning outcomes: After completing the master's thesis the student will be able

- o to plan and implement a research project in a timeframe
- o to define appropriate research questions and base them with a theoretical framework
- o to design and carry out experiments under supervision
- o to analyse and interpret the research results
- o to present the results of the research according to scientific standards
- o to receive and use feedback in his/her own research and writing
- o to apply ethical principles in science.

The student has experience of scientific thinking, problem solving, building of models and hypotheses, experimental design, working in a laboratory including possible pilot-scale experiments, and presentation of results and their critical discussion.

Course completion methods: Approval and grading is based on the written Master's thesis. The thesis cannot be approved until the student has passed the maturity test (if not taken already at bachelor level). MSc thesis includes a written research plan and experimental part that is carried out under supervision. Student will write the MSc thesis. Typically, the work is carried out in a research project in which you have a clearly defined and an independent role. The total workload from designing the project (for 30 credits) to its completion is approximately 4.5 months (800 h or 20 weeks at 40 h/week). For detailed information about the Master's thesis, see the Faculty's General Instructions for Master's Theses.

Prerequisites: Completion of most of the compulsory and prerequisite food core courses and the compulsory courses of the chosen study module in the Food Science master's programme. The student needs to have the necessary knowledge and skills for collecting the data and processing (statistics) them, and skills for scientific writing.

Content: The Master's thesis is usually based on an experimental research project and critical contemplation of the results in the light of scientific literature on the topic. The thesis may also consist of a theoretical literature study. A Master's thesis project usually consists of four distinct phases

1. design and planning of the study
2. gathering the data (laboratory work and/or mathematical modelling)
3. analysing the data (validation/quality control, statistical analysis, plotting)
4. interpreting and discussing the results in the light of existing literature.

Activities supportive for learning: -

Assessment practices and criteria, grading scale: The MSc thesis will be graded on the scale according the guidelines set by the University and the Faculty. <https://guide.student.helsinki.fi/fi/artikkeli/tutkielma-ja-kypsyysnayte-maisterin-tutkinnossa>

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä. The student need to enroll in Seminars for Food Sciences (FOOD-104) and pass the course accordingly.

FOOD-101 Food Processing Technology, 3 cr

Name: Food Processing Technology

Code: FOOD-101

Course status: compulsory or optional: The course is compulsory for Food Sciences master's students. The course is available for other students with bachelor level knowledge in food sciences.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 3

Teacher coordinating the course: Laila Seppä

Learning outcomes: After the course the student can explain the theory and working principle of conventional processing technologies (e.g. preservation and separation methods) used in food industry and their effects on food materials. The student can give detailed and illustrative examples of conventional processing technologies and their real-life applications. Group working, networking and debating skills are intended learning outcomes of this course.

Course completion methods: Contact teaching 20 h, group work 30 h, self study 30 h. Participation in group work and debates. Attendance at 90% of debating seminars and group meetings with the teacher is compulsory.

Prerequisites: Bachelor level knowledge in Food Sciences.

Recommended optional studies:

Content: The conventional food processes: e.g. preservation and separation methods.

Recommended and required literature: Literature and study realisation will be described at the first course meeting.

Activities supportive for learning: Lectures given by the teachers, debates of the groups of the students.

Assessment practices and criteria, grading scale: The grade is based on examination (50%) and group work including report, teaching seminars and acting as an opponent (50%). The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-102 Food Structure, lectures, 3 cr

Code: FOOD-102

Course status: compulsory or optional: The course is compulsory for Food Sciences master's students. The course is available for other students with bachelor level knowledge in Food Sciences

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 3

Teacher coordinating the course: Hanna Koivula

Learning outcomes: After the course the student has an understanding of the principles of structural and rheological characteristics of food systems. The student can explain how the food structures and food physical properties are evaluated and measured. The student understands the complexity of food materials and the structural levels where they can be measured. The student understands the connection of food stability and physical properties of food matrix.

Course completion methods: Lecture series, contact teaching 30 h, practical work 0 h, group work 0 h, self study 50 h

Prerequisites: Bachelor level knowledge in food sciences

Recommended optional studies:

Content: The structure and physical properties of food systems

Recommended and required literature (recommended or/and compulsory clearly separated): Background information will be available at Moodle page

Activities supportive for learning (student's activities, teacher's actions)

Assessment practices and criteria, grading scale: Examination 100%. The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-103 Food Additives, 5 cr

Code: FOOD-103

Course status: compulsory or optional: The course is compulsory for Food Sciences master's students. The course is available for other students with bachelor level knowledge in food sciences.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Period II

Teacher coordinating the course: Marina Heinonen

Learning outcomes: After completing the course the student has a know-how on food additive legislation and understands the chemical and technological properties of the most relevant food additives used as food improvement agents.

Course completion methods: Lecture series + written essays, contact teaching 30 h, self study 103 h.

Prerequisites: Bachelor level knowledge in food sciences.

Recommended optional studies: -

Content: Principles of use of food additives, European legislation on food additives, evaluation of safety of food additives, and chemical and technological properties of food additives with examples of food applications on selected food additive categories including food colours, preservatives, antioxidants, emulsifiers & stabilizers, flavour enhancers, and sweeteners.

Recommended and required literature: Material will be provided via Moodle with links to current food additives legislation

Activities supportive for learning: -

Assessment practices and criteria, grading scale: Literature examination 80%, written essays 20%. The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-104 Seminars in Food Sciences, 3 cr

Code: FOOD-104

Compulsory or optional: The course is compulsory for all students of the Food Sciences master's programme.

Level of the course: 7

Recommended time/stage of studies for completion: The course starts once in the fall and once in the spring semester with an introductory lecture on personal study plans. Students should start the course as soon as they enter the programme.

Term/teaching period when the course will be offered: In addition to the introductory lecture of personal study plans, MSc students give two presentations on their theses in all periods (I-IV).

Scope of the course in credits: 3

Teacher coordinating the course: Laila Seppä

Learning outcomes: The student has good understanding of the Food Science Master's Programme, its structure, elective study modules, other modules of choice and elective studies, and is able to prepare a personal study plan. By attending the seminar sessions of other MSc students, the student learns about the research interests and projects linked to the Programme, which helps her/him to choose elective studies and modules and to specialize in specific areas of the Programme. The student is able to participate in a seminar in different roles, analysing and discussing the presentations. The student is able to compile two different types of presentations and give presentations complied with the scientific criteria.

Course completion methods: Participating in the introductory lecture, preparation of a personal study plan, attendance to 12 MSc seminar sessions, presenting two presentations and participation in seminars in different roles. Contact teaching 30 h - group work 8 h - self study 40 h.

Prerequisites: -

Recommended optional studies: -

Content: Attendance to seminars and preparation of a personal study plan. Presenting two seminars: one based on literature and on the literature survey and research plan of the student's own master's thesis, and one representing the results of the master's thesis. A poster is presented in connection with the last seminar. The seminar schedule is published and updated in the course moodle area.

Recommended and required literature: Instructions for seminar presentations will be available in the Moodle as the EKT Series instructions for completion of theses. Further material for preparation of personal study plans and participation in seminars are provided via Moodle.

Activities supportive for learning (student's activities, teacher's actions): -

Assessment practices and criteria, grading scale: The performance in the seminars will be graded using a scale 0-5.

Language of instruction: English and/or Finnish

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-105 Research Exercise in Food Sciences, 6-10 cr

Code: FOOD-105

Course status: compulsory or optional: The course is compulsory for Food Sciences master's students writing master's thesis within study modules of Food Chemistry, Food Technology, Meat Science and Technology, Dairy Science and Technology, and Grain Science and Technology.

Level: 7

Recommended time/stage of studies for completion: 2nd year, prior to master's thesis

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 6-10

Teacher coordinating the course: According to specific study module

Learning outcomes: The student can search and evaluate scientific literature and is able to utilize the knowledge for making a research plan for the master's thesis. The student becomes familiar with the methods, processes and materials needed in the thesis research. After the course the student can, under light-supervision, plan and carry out a study to solve clearly outlined, small research problem and report the study orally and in writing.

Course completion methods: The student writes an essay on a literature survey (5-6 cr) and a research plan (1 cr) – both relevant for the chosen Master's thesis topic. The student may perform pre-experiments for the Master's thesis (3 cr). The course may include laboratory work, contact teaching and/or group work according to specific study module (3 cr). More specific guidance is available from the responsible persons of the study modules.

Prerequisites: The courses in the specific study module in Food Sciences master's programme

Recommended optional studies:

Content: Literature search, writing an essay and a research plan for the master's thesis project. Preliminary laboratory experiments and a written report.

Recommended and required literature: Literature searched on a topic related with the master's thesis research.

Activities supportive for learning: Problem solving, reporting orally and in writing.

Assessment practices and criteria, grading scale: The grading will be according to specific study modules (using scale 0-5)

Language of instruction: English

Additional information: The course is available only for students carrying out their theses within study modules of Food Chemistry, Food Technology, Meat Science and Technology, Dairy Science and Technology, or Grain Science and Technology. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-106 Vitamins and other bioactive compounds, 5 cr

Code: FOOD-106

Course status: compulsory or optional: The course is optional for Food Sciences master's students. The course is available for other students with bachelor level knowledge in food sciences or chemistry.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Period IV, even years only

Scope of the course in credits: 5

Teacher coordinating the course: Susanna Kariluoto

Learning outcomes: The student can define and categorise terms related to bioactive compounds and their health effects. The student has good understanding of the chemistry, occurrence, and functions of vitamins and other bioactive compounds, and can describe analytical methods for determining bioactive compounds. The student is able to assess factors affecting intake and bioavailability of bioactive compounds. In addition, the student can describe the basis and review critically arguments for and against supplementation.

Course completion methods: Lecture series, contact teaching 46 h, practical work 0 h, group work 0 h, self study 88 h.

Prerequisites: bachelor level knowledge in food sciences or chemistry

Content: Chemical and biochemical properties, principal mechanisms of action (bioactivity) and analytical methods regarding vitamins and other bioactive compounds such as carotenoids, plant phenolics, phytosterols, and phytochemicals in cereals and legumes. Food supplementation will also be introduced.

Recommended and required literature: Material provided during the course. Supportive reading: Belitz, H.-D. et al. *Food Chemistry*, 2004; Damodaran S & Parkin KL, *Fennema's Food Chemistry*, 5th edition, CRC Press Inc., New York, 2017.

Activities supportive for learning: Group discussions and small tasks during the lectures

Assessment practices and criteria, grading scale The grade is based on written assignments and final examination. The performance will be graded using a scale of 0–5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-107 Organic Chemistry in Food Sciences, 5 cr

Code: FOOD-107

Course status: compulsory or optional: The course is pre-requisite for Food Chemistry module. The course is available for other master's students with bachelor level knowledge in food sciences or in chemistry.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I-II (the course is arranged in two periods)

Scope of the course in credits: 5

Teacher coordinating the course: Ndegwa Maina

Learning outcomes: The course deepens knowledge on organic chemistry in the aspect of chemical structures, functional groups, and reaction mechanisms. By using Chemdraw, the students will learn how to illustrate and follow reaction mechanisms. The preparation methods and typical reactions for different types of compounds and their modern applications in food sciences become familiar. The student will also have knowledge on industrial, environmental and biological significance of organic compounds. Problem-based learning (PBL) will be used as a learning method, and teamwork skills will be developed

Course completion methods: A pre-course exam covering the basics of organic chemistry will be given at the beginning of the course. Contact teaching by lectures (18 h). Compulsory group works (ca. 77 h). Independent studies and exercises (ca. 40 h). The exercises will include various tasks to be completed using Chemdraw.

Prerequisites: Basic knowledge on organic chemistry.

Recommended optional studies:

Content: Organic compounds, their chemical structures, functional groups, and reaction mechanisms in the aspect of food sciences.

Recommended and required literature: McMurry, J. 2010 or 2012: Organic Chemistry, and/or corresponding books of organic chemistry.

Activities supportive for learning: Problem-based learning, group work, exercises, independent studies

Assessment practices and criteria, grading scale: Group work, independent exercises, and a take home exam. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Priority is given to students choosing the study module of Food Chemistry. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-108, Organic Structure Analysis, 5 cr

Code: FOOD-108

Course status: compulsory or optional: The course is part of the Food Chemistry study module (FOOD-300) and is mandatory for students who do a master's thesis in the Food Chemistry. The course is also suitable for other master's students with bachelor level knowledge in food sciences or in chemistry

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period III- IV

Scope of the course in credits: 5

Teacher coordinating the course: Ndegwa Maina

Learning outcomes: The course aims to introduce the spectroscopic methods used in elucidating the structure of organic molecules. The student learns basics of spectrometric techniques, such as infrared (IR), mass (MS), and nuclear magnetic resonance (NMR) spectrometry and will acquire the necessary background for interpretation of IR, MS and NMR data in order to identify functional groups and determine the structural features of organic compounds. The course includes lectures and laboratory work designed to integrate both theory and practical problem solving. During the laboratory work, the student will also learn organic chemistry laboratory methods and skills to handle organic materials safely during isolation and purification of an unknown compound. IR, MS and NMR spectra of the compounds will be obtained and used to identify the compound. Scientific writing skills will be developed by writing a final report.

Course completion methods: The course includes lectures and laboratory work. Contact teaching 105 h and independent studies ca. 30

Prerequisites: Course "FOOD-107 Organic Chemistry in Food Sciences" or equivalent knowledge.

Recommended optional studies:

Content: Lectures to cover theoretical aspects of spectrometric methods: IR, MS, NMR. Lectures include spectra interpretation exercises. Laboratory work to provide knowledge on sample preparation (isolation and purification) and acquisition of spectra for structure elucidation purposes. Scientific writing/final report.

Recommended and required literature: Williams DH and Fleming I, 1995, Spectroscopic Methods in Organic Chemistry, Mc Graw Hill and materials distributed during the course.

Activities supportive for learning: Exercises, laboratory work, independent studies

Assessment practices and criteria, grading scale: The grade is based on final exam and a laboratory report. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Maximum number of students is 15. Priority is given to students choosing the study module of Food Chemistry. Kurssin voi suorittaa myös suomen kielellä.

Relations to other study units: Replaces the former course 85035 Orgaaninen rakenneanalyysi 4 cr and 85045 Spektrometrian luentokurssi 3 cr.

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

Code: FOOD-109

Compulsory or optional: The course is optional for Food Sciences master's students. The course is available for other students with bachelor level knowledge in chemistry, biochemistry, microbiology.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period III

Scope of the course in credits: 5

Teacher coordinating the course: Kati Katina

Learning outcomes: At the end of the course students will understand the role of microorganisms and enzymes in food processing and learn their effects on food properties

Course completion methods: Lecture series (28 h), written essay of selected topic. Contact teaching 28 h, group work 30 h, self-study 80 h.

Prerequisites: Bachelor level knowledge in food sciences

Recommended optional studies: Food microbiology, LAB starters

Content: Basics of microbial metabolism, fermentation technology, food enzymes and their uses in food manufacturing.

Recommended and required literature Literature (compulsory and recommended) is assigned during the course

Activities supportive for learning: Lectures contain the theoretical background and group assignment (essay) deepen the learning. Participation in the lectures is strongly recommended.

Assessment practices and criteria, grading scale: Essay (50%), final examination (50%)

Assessment practices and criteria, grading scale: Activity, evaluation of essay, examination

Language of instruction: English

Additional information: Priority given to students enrolling in the Food Science master's programme. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-110 Cereal and Pulse Ingredient Functionality, 2 cr

Code: FOOD-110

Course status: compulsory or optional: The course is compulsory in the Grain Science and Technology study module. The course is available for other students with bachelor level knowledge in food sciences.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 2

Teacher coordinating the course: Noora Mäkelä-Salmi

Learning outcomes: After the course, the student knows and understands the role of essential plant based functional ingredients in food processes. Student will be able to compose and interpret ingredient specifications.

Course completion methods : Lectures, written assignments and workshop.

Prerequisites: Bachelor level knowledge in food sciences.

Recommended optional studies: Food Crop Quality

Content: Cereal, legume and other plant based ingredients including hydrocolloids, proteins, starches, etc.

Recommended and required literature (recommended or/and compulsory clearly separated): Background information and instructions will be available at Moodle page, as well as some lecture-specific recommended articles. Other recommended reading: Books in Eagan Handbook Series (Hydrocolloids, Starches, Fiber Ingredients, Nutritive Sweeteners), Delcour & Hosney. 2010. Principles of Cereal Science and Technology, AACCI Press. During the course, it is compulsory to search for scientific articles and other written materials to complete the reports.

Activities and teaching methods in support of learning: Lectures introduce the theoretical background and written assignments and workshop event deepen the learning.

Assessment practices and criteria, grading scale: Students will write short reports during the course based on which they will do a final written report, which will make 100% of the grade. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-111 Dairy Science and Technology 1, 2 cr

Code: FOOD-111

Course status: compulsory or optional: The course is compulsory in the Dairy Science and Technology study module. The course is available for any students interested. Bachelor level knowledge in biological / food sciences is helpful.

Level: MSc

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I-II

Scope of the course in credits: 2

Teacher coordinating the course: Tapani Alatossava

Learning outcomes: The student understands the basic milk properties, properties of LAB starters for fermented milks, main unit operations and manufacture of most common liquid dairy products.

Course completion methods: Contact teaching 26 h, self study 26 h.

Prerequisites:

Recommendation for elective studies:

Content: Biology, biochemistry and microbiology of bovine raw milk, main unit operations (heat treatments, separation, homogenization) and manufacture of milks and creams, lactic acid bacteria and their use as starters, manufacture of fermented milks.

Recommended and required literature: Handouts on each of 13 lectures are available on the Moodle.

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Exam, grades 0-5.

Language of instruction: English

Additional information:

FOOD-112 Dairy Science and Technology 2, 2 cr

Code: FOOD-112

Course status: compulsory or optional: The course is compulsory in the Dairy Science and Technology study module. The course is available for any students interested. Bachelor level knowledge in biological / food Sciences is helpful.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Periods III-IV

Scope of the course in credits: 2

Teacher coordinating the course: Tapani Alatossava

Learning outcomes: The student understands the biochemistry of main milk components (proteins, lipids, lactose and salts), and main unit operations and manufacture of most common cheeses, butter and milk/whey powders.

Course completion methods: Contact teaching 26 h, self study 26 h.

Prerequisites: The preceding course Dairy Science and Technology 1 is helpful to perform before this course.

Recommendation for elective studies:

Content: Biology and biochemistry of bovine milk proteins and lipids. Manufacture and ripening of cheeses. Cheese starters and adjunct starters. Butter manufacture. Membrane separation processes for milk/whey proteins, lactose and salts. Milk/whey powder and lactose technology.

Recommended and required literature: Handouts on each lecture of 13 lectures are available on the Moodle.

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Exam, grades 0-5.

Language of instruction: English

Additional information:

FOOD-113 Meat Science, lectures, 5 cr

Code: FOOD-113

Course status: compulsory or optional: The course is a prerequisite for the Meat Science and Technology study module. The course is available for other students with bachelor level knowledge in food sciences including meat science and technology.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 5

Teacher coordinating the course: Per Ertbjerg

Learning outcomes: A deep understanding of muscle structure, and the biochemical and chemical changes occurring in muscle and meat

Course completion methods: Contact teaching 36 h, seminars 12 h, written essays, self-study 86 h

Prerequisites: Bachelor level knowledge in food sciences including meat science and technology

Recommended optional studies

Content: Lectures and seminars covering muscle structure, muscle fibers, connective tissue, energy metabolism, muscle contraction and its influence on meat quality, tenderization during ageing of meat, water-holding and colour as well as on nutritional value of meat and toxic aspects in meat.

Recommended and required literature: 1) R. A. Lawrie, D.A. Ledward: Lawries Meat Science, CRC Woodhead Publ. in Food Science; Technology and Nutrition, 7th Edition. 2) P.D. Warriss: Meat Science: An introductory Text. Cambridge University Press, Cambridge, UK, 2nd Edition, 2010. 3) Additional material distributed.

Activities supportive for learning:

Assessment practices and criteria, grading scale: Attendance to lectures and seminars, literature examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information:

FOOD-115 Practical Training in Food Sciences, 2-4 cr

Code: FOOD-115

Course status: compulsory or optional: The course is one of the optional courses in the Food Sciences core studies.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Recommended for summer, period I-IV

Scope of the course in credits: 2-4

Teacher coordinating the course: according to the study module: Food Chemistry, Velimatti Ollilainen; Food Technology, Hanna Koivula; Dairy Science and Technology, Pekka Varmanen; Grain Science and Technology, Meat Science and Technology, Per Ertbjerg

Learning outcomes: After completion of the practical training the student is familiar with the working environment of food industry or other enterprise, institute or authority. Also laboratory work can be included. The student will gain managerial, planning, control, or research experience.

Course completion methods: Practical training of one month equals one credit. One credit will be awarded for a written report.

Prerequisites: Bachelor level knowledge in food sciences

Recommended optional studies

Content: Practical training and written report

Recommended and required literature:

Activities supportive for learning:

Assessment practices and criteria, grading scale: The written report will be graded using a scale of 0-5.

Language of instruction:

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä

FOOD-116 Advanced Sensory Science, 5 cr

Code: FOOD-116

Course status: compulsory or optional: The course is optional for all students in food sciences but recommended for students who specialize in the module of Product Development in the Food Sector (Tuotekehitys elintarvikealalla).

Level: 7

Recommended time/stage of studies for completion: 1st year (recommended).

Term/teaching period when the course will be offered: Periods III (lectures and laboratory exercises) and IV (teamwork and final seminar).

Scope of the course in credits: 5

Teacher coordinating the course: Mari Sandell

Learning outcomes: After the course the student can design and conduct a sensory study, analyze the results using relevant statistical methods and report the study applying principles of scientific writing. The student can conduct sensory research using both trained (generic descriptive analysis) and untrained panels (consumer research), and analyze the data. Skills of teamwork and scientific writing will be developed.

Course completion methods: Lectures, two laboratory exercises with a joint written report, and a teamwork (sensory study of a given topic) with a written report and oral presentation.

Preceding studies: ETK-240 Aistinvaraisen tutkimuksen perusteet (for Finnish speaking students) or FOOD-117 Literature Examination, Sensory Science (for non-Finnish speaking students), or equivalent basic knowledge of sensory food science. Basics of statistics (ME-004 (Y130A) Tilastollisen ajattelun perusteet and ME-005 (Y130B) Tilastollisten menetelmien perusteet, or equivalent knowledge).

Recommended optional studies: Studies of statistics (especially multivariate methods such as PCA) are highly recommended (e.g., FOR-007 (Y131) Tilastollisia malleja: Yleistettyjen lineaaristen mallien perusteet, or equivalent courses).

Content: Advanced methods of sensory food science in theory and practice, including descriptive analysis and measurement of consumers' responses. Design and implementation of sensory studies (choosing appropriate methods, scales and panelists) for given food samples.

Recommended and required literature: Lawless, H. & Heymann, H. Sensory evaluation of food. Principles and practices. Springer, 2010. Additional literature will be shared on the Moodle site of the course.

Activities supportive for learning: Lectures introduce theoretical background for the methods that will be used in the laboratory exercises. During the exercises and teamwork, data from sensory studies will be collected in the sensory laboratory and field, analyzed statistically, and reported using the principles of scientific writing.

Assessment practices and criteria, grading scale: Using a scale of 0–5. Weights: Written report of exercises 40%, written report of teamwork 50%, and participation in sensory studies as a panelist 10%.

Language of instruction: English

Additional information: Maximum number of students is 32. Priority will be given to students choosing the study module of Product Development in the Food Sector. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-117 Literature Exam, Sensory Science, 5 cr

Code: FOOD-117

Course status: compulsory or optional: This course is compulsory (and available) for those students who wish to enroll the course Advanced Sensory Science, but do not have previous studies (basic knowledge) of sensory food science.

Level: 7

Recommended time/stage of studies for completion: 1st year (prior to Advanced Sensory Science)-

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 5

Teacher coordinating the course: Mari Sandell

Learning outcomes: After the course (passing the exam) the student understands the basics of the senses and sensory food science (basic procedures, scales, panels, and data analyses).

Course completion methods: Literature examination in a general exam day (2 hours).

Preceding studies: -

Recommended optional studies: -

Content: Basics of the senses (especially the chemical senses) and sensory food science.

Recommended and required literature: Literature for the exam will be announced on the course site.

Activities supportive for learning: -

Assessment practices and criteria, grading scale: Written exam, graded using a scale of 0–5.

Language of instruction: English

Additional information: This exam is available only for those students, who cannot participate in the bachelor level course (in Finnish) ETK-240 Aistinvaraisen tutkimuksen perusteet.

FOOD-118 Literature Exam, Packaging Technology, 3 cr

Code: FOOD-118

Course status: compulsory or optional: This course is compulsory (and available) for those students who wish to enroll the courses FOOD-604 Advanced Lectures in Packaging Technology and FOOD-603 Packaging Technology, lab work, but do not have sufficient (>5 cr) previous studies in food packaging technologies.

Level: 7

Recommended time/stage of studies for completion: 1st year (prior to FOOD-604 Advanced Lectures in Packaging Technology and FOOD-603 Packaging Technology, lab work)-

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 5

Teacher coordinating the course: Hanna Koivula

Learning outcomes: After passing the exam, the student has a better understanding of the fundamentals of packaging technology especially in the context of food packaging: he/ can describe purpose and roles of packaging for food; discuss the properties of different plastics; describe the working principle of plastic processing and printing methods.; can give examples of packaging machinery and lines. Student can apply his or her knowledge in evaluating the functionality of food packaging.

Course completion methods: Literature examination in a general exam day (2 hours).

Preceding studies: -

Recommended optional studies: -

Content: Basics of the food packaging.

Recommended and required literature: Packaging Technology: Fundamentals, Materials and Processes by Anne Emblem and Henry Emblem (2012), Chapters 1-6, 13-14 and 18-20. E-book available through university library.

Activities supportive for learning: -

Assessment practices and criteria, grading scale: Written exam, graded using a scale of 0–5.

Language of instruction: English

Additional information: Former code FOOD-119. This exam is available only for exchange students and students entering the FOOD M.Sc. program from B.Sc. programs other than EKT. If a student does not have any packaging studies, the course EKT-250 is preferred instead of this course.

FOOD-120 Working in a Research Group, 1-5 cr

Code: FOOD-120

Is the course compulsory or optional: The course is optional for students choosing the Food Chemistry, Food Technology, Dairy Science and Technology, or Grain Science and Technology study module of the Food Sciences Master's Programme.

Level of the course: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Periods I-IV, also during summer

Scope of the course in credits: 1-5

Teacher coordinating the course: according to the specific study module

Learning outcomes: The student becomes familiar with use of chosen analytical methods and monitoring quality of analysis in practice. The student is able to carry out experiments based on given instructions, report the results and evaluate his/her performance.

Course completion methods: Working in a research group and a written report including self-evaluation of performance. Full-time working for 5 weeks is equivalent to 5 credits.

Prerequisites: The prerequisite courses for the selected study module

Recommended optional studies

Content: Working in a research group focusing on a selected research topic and methods.

Recommended and required literature: As recommended by the research group to learn theory of the research questions and methods.

Activities supportive for learning: Personal supervision in laboratory work. Self-evaluation as part of the report.

Assessment practices and criteria, grading scale: Performance during the work and written report using a scale Pass-Fail.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä tutkimusryhmästä riippuen. Priority will be given to students who will carry out their master's thesis in Food Chemistry, Food Technology, Dairy Science and Technology, or Grain Science and Technology study module.

FOOD-121 Practical Teaching Training, 1-10

Code: FOOD-121

Course status: compulsory or optional: This course is optional for those students who wish to obtain practical training in teaching.

Level: 7

Recommended time/stage of studies for completion: 1st and 2nd year

Term/teaching period when the course will be offered: Periods I-IV.

Scope of the course in credits: 1-10

Teacher coordinating the course: N.N.

Learning outcomes: After teaching others the student understands how the teaching curriculum transfers to practical teaching. After teaching the student has a deeper understanding about the particular subject area covered.

Course completion methods: Planning of teaching, teaching activities and evaluation of learning outcomes.

Preceding studies: BSc degree and other background studies suitable to carry out the particular teaching.

Recommended optional studies: Pedagogical studies

Content: Contact teaching / design and substance for web based teaching / production of teaching materials / experimenting with different pedagogical methods

Recommended and required literature: Optional: Biggs J, Tang C. 2011. Teaching for quality learning at university / Lindblom-Ylänne S, Nevgi A, Horppu R, Iivanainen A. 2007. Yliopisto- ja korkeakouluopettajan käsikirja.

Activities supportive for learning: Supervision, guidelines and practical help for teaching.

Assessment practices and criteria, grading scale: Pass-Fail

Language of instruction: English when teaching in Master's study level; Finnish when teaching in Bachelor's study level.

FOOD-201 LAB Starters and Probiotics, 4 cr

Code: FOOD-201

Course status: compulsory or optional: The course is compulsory in the Dairy Science and Technology study module. The course is available for other students -with basic knowledge of microbiology

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 4

Teacher coordinating the course: Pekka Varmanen

Learning outcomes: The student is familiar with the most common lactic acid bacteria (LAB) used as starters and probiotics in food industry and masters the common laboratory methods used for LAB cultivation and identification

Course completion methods: Lectures, practical laboratory works and demonstrations. Contact teaching 10 h, practical work 60 h, group work 0 h, self study 24 h.

Prerequisites: At least one microbiology laboratory course has been performed

Recommendation for elective studies:

Content: A laboratory course containing microbiological methods to cultivate, enumerate and isolate lactococci, streptococci and lactobacilli. Identification of LAB starter and probiotic strains isolated from various fermented foods. Analysis of stress tolerance of a model probiotic. Strain specific identification by PCR and gel-electrophoresis.

Recommended and required literature: Course manual. Indicated book chapters and other teaching material distributed during the course

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Participation activity and reports (50%), exam (50%). Grades 0-5.

Language of instruction: English

Additional information: The maximum number of the students in this course is 12. Priority will be given to students writing master's thesis in the Dairy Science and Technology study module. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-202 Liquid Milk Products, 6 cr

Code: FOOD-202

Course status: compulsory or optional: The course is compulsory in the Dairy Science and Technology study module. The course is available for other students with basic knowledge in food sciences

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Periods I-II

Scope of the course in credits: 6

Teacher coordinating the course: Tapani Alatossava

Learning outcomes: The student understands the manufacture of milks, creams and fermented milk products, the structure and function of most common dairy equipments required for the manufacture of liquid milk products, the importance of cleaning processes and procedures, HACCP as an in-house control system, and spoilage and shelf life of liquid milk products.

Course completion methods: Contact teaching 20 h, laboratory work 20 h, group work 50 h and self study 65 h.

Prerequisites: Dairy Science and Technology 1 course should be performed latest during the same semester with this course.

Recommendation for elective studies:

Content: Microbiology of raw and pasteurized milks: spoilage bacteria (pseudomonads and bacilli). Robotic milking and cold chain of raw milk. Learning GHP and GMP, and the use of equipments for dairy unit operations in Viikki pilot dairy plant. Production of fermented milks (e.g., yogurt and Vili) in a small scale. Excursions to University dairy farm and two local dairies manufacturing liquid milk products. Seminars on indicated subjects. Lectures by visiting specialists. Theory on indicated literature.

Recommended and required literature: Indicated book chapters. Other literature and teaching material distributed during the course.

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Activity (25%), seminars and reports (15-25%), exam (50-60%). Grades 0-5.

Language of instruction: English

Additional information: The maximum number of the students in this course is 10. Priority will be given to students writing master's thesis in the Dairy Science and Technology study module. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-203 Solid Milk Products, 6 cr

Code: FOOD-203

Course status: compulsory or optional: The course is compulsory for the students performing the Dairy Science and Technology module. The course is available for other students with basic knowledge in food sciences.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Periods III-IV

Scope of the course in credits: 6

Teacher coordinating the course: Pekka Varmanen

Learning outcomes: The general goal is to provide students with knowledge of the technology involved in processing of solid milk products including cheese, butter, dried and concentrated milks. After completing the course the student should understand the manufacturing processes of cheeses, butter, and milk powder, the structure and function of most common dairy equipments used in the manufacture of solid milk products, the chemical properties, reactivity and analysis of milk components, the principles of cheese making, the ripening process and the microbial defects.

Course completion methods: Contact teaching 20 h, laboratory work 20 h, group work 50 h and self study 65 h.

Prerequisites: Dairy Science and Technology 1 and Liquid Milk Products courses

Recommendation for elective studies:

Content: Milk components. Protein analyses. Milk treatment for cheese making, renneting of milk, production of different cheese types, ripening of cheese. Production of cheese varieties (e.g. white mold, semihard, cottage cheese), and butter in Viikki pilot dairy plant. Membrane processes and whey processing. Excursions to dairies manufacturing solid milk products. Seminars on indicated subjects. Lectures by visiting specialists. Theory on indicated literature.

Recommended and required literature: Indicated book chapters. Other literature and teaching material distributed during the course.

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Activity (25%), seminars and reports (15-25%), exam (50-60%). Grades 0-5.

Language of instruction: English

Additional information: The maximum number of the students in this course is 10. Priority will be given to students writing master's thesis in the Dairy Science and Technology study module. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-204 Literature Exam, Dairy Science and Technology, 4 cr

Code: FOOD-204

Course status: compulsory or optional: The course is compulsory in the Dairy Science and Technology study module.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 4

Teacher coordinating the course: Tapani Alatossava

Learning outcomes:

Course completion methods: Self study 100 h.

Prerequisites: Dairy Science and Technology 1 and 2 course should be performed latest during the same semester with this course.

Recommendation for elective studies:

Content: Theory studies on indicated book chapters in total up to 600 pages.

Recommended and required literature: Indicated book chapters on *Dairy Science and Technology* by P. Walstra, J.T.M. Wouters & T.J. Geurts (CRC, 2006 or latest edition).

Activities and teaching methods in support of learning:

Assessment practices and criteria, grading scale: Exam. Grades 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-301 Research in Food Chemistry, 2 cr

Code: FOOD-301

Course status: compulsory or optional: The course is compulsory for those students in Food Sciences Master's Programme who choose the Food Chemistry study module with a master's thesis included. The course is prerequisite for Research Exercise and Master's thesis in Food Chemistry.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year.

Term/teaching period when the course will be offered: Periods III-IV (mainly IV).

Scope of the course in credits: 2

Teacher coordinating the course: Vieno Piironen

Learning outcomes: The student knows basics in scientific research such as planning, funding, oral and written presentation as well as ethical aspects.

Course completion methods: Contact teaching 20 h, self-study 35 h including writing a research plan, an abstract and giving two oral presentations based on a given scientific paper, learning diary 5 h. Active attendance at teaching sessions is required.

Prerequisites: Bachelor level knowledge in food sciences.

Recommended optional studies: Knowledge of the compulsory core studies for the Food Chemistry module are helpful for the course.

Content: Food chemistry research in Finland and internationally, research planning, funding and ethics, oral and written presentation, requirements in master's thesis project and writing.

Recommended and required literature: Available in Moodle.

Activities supportive for learning: Students own activities, reading, writing and oral presenting, are the focus of the course.

Assessment practices and criteria, grading scale: The performance will be graded using a scale 0-5. The grade is based on written research plan, abstract, oral presentation, and learning diary.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä. Priority is given to students who carry out their master's thesis in Food Chemistry. Maximum number of students is 15.

FOOD-302 Research Methods in Food Chemistry, 8 cr

Code: FOOD-302

Course status: compulsory or optional: The course is compulsory for those students in the Food Sciences Master's Programme who choose the Food Chemistry study module with a master's thesis included.

Level: 7

Term/teaching period when the course will be offered: Periods I- II

Recommended time/stage of studies for completion: 2nd year

Scope of the course in credits: 8

Teacher coordinating the course: Susanna Kariluoto, Anna-Maija Lampi ja Velimatti Ollilainen

Learning outcomes: After completing the course, the student understands and is able to evaluate research methods and experimental setups that are applied to study composition, changes and chemical reactions in foods. The course also enables to write scientific papers, reports and MSc thesis, and to give small presentations of her/his own results. After the course the student can apply these issues in her/his own scientific research.

Course completion methods: Laboratory work, meetings and reports.

Prerequisites: Elintarvikekemiallinen analytiikka, laboratoriotyöt (ETK-225), Organic Chemistry in Food Sciences (FOOD-107) and Separation Techniques (GC&LC) (KEM331) or equivalent knowledge.

Recommended optional studies:

Content: The course includes four extensive laboratory tasks including meetings before and after the laboratory work. Each task is done in small groups. The student writes a report on each task individually. With these tasks the student is familiarized with several chromatographic and spectroscopic techniques, quality aspects of data and method development, and evaluation of experimental data. The theoretical background of each task is presented.

Recommended and required literature (recommended or/and compulsory clearly separated) **compulsory:** all course materials are available in Moodle

Activities supportive for learning: Students participate in teaching of the background of the tasks and in evaluating the experimental results. They will get feedback from the first version of their reports.

Assessment practices and criteria, grading scale: Evaluation is mainly based on task reports. In addition activity and overall performance during the course are also evaluated. A scale of 0-5 is used for grading.

Language of instruction: English

Additional information: Maximum number of students is 15. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-303 Literature Exam 1, Food Chemistry, 5 cr

Code: FOOD-303

Is the course compulsory or optional: The course is compulsory in the Food Chemistry study module. The course is available for other students of the Food Sciences Master's Programme. The examination is prerequisite for starting a master's thesis in Food Chemistry.

Level of the course: 7

Recommended time/stage of studies for completion: Recommended timing period I or II in the 2nd year.

Term/teaching period when the course will be offered: The examination can be carried out on all general examination days in Food Chemistry.

Scope of the course in credits: 5

Teacher coordinating the course: Vieno Piironen

Learning outcomes: The student has good understanding of chemical structures, reactions, interactions and structure-functionality relationship of the main food components. The student knows chemical basis of the behavior and role of the major food components and ingredients.

Course completion methods: Independent reading for 135 h and a written examination.

Prerequisites: The optimal timing for the examination is after completing the compulsory core courses for the Food Chemistry module and majority of its module specific courses.

Recommended optional studies

Content: The focus lies on carbohydrates, proteins, lipids and other most important food component: structure, reactions, interactions, function in foods.

Recommended and required literature: Damodaran S & Parkin KL, *Fennema's Food Chemistry*, 5th edition, CRC Press Inc., New York, 2017, chapters 1-6, from chapter 7 parts 7.5-7.7.

Activities supportive for learning: Simultaneously studying students are encouraged to form reading groups. The teacher may take part in discussion as agreed with the students. After a written examination the student will get oral feedback.

Assessment practices and criteria, grading scale: The performance in the examination will be graded using a scale 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-304 Literature Exam 2, Food Chemistry, 5 cr

Code: FOOD-304

Is the course compulsory or optional: The course is optional in the Food Chemistry study module.

Level of the course: 7

Recommended time/stage of studies for completion: Recommended timing during the 2nd year.

Term/teaching period when the course will be offered: The examination can be carried out on all general examination days in Food Chemistry.

Scope of the course in credits: 5

Teacher coordinating the course: Vieno Piironen

Learning outcomes: The student is able to apply obtained knowledge on a selected special field in food chemistry to understand and solve chemistry-based questions related to food quality or analysis.

Course completion methods: Independent reading for 135 h and a written examination.

Prerequisites: Recommended to be taken in the last part of the master studies.

Recommended optional studies

Content: The content is chosen based on interest of the student, e.g., to focus may be on chemistry of food components and ingredients, quantitative and structure analysis of food components, quality of food ingredients and foods.

Recommended and required literature: Literature will be selected from a list of recommended books in Moodle. Other books may be suggested by the student.

Activities supportive for learning: Simultaneously studying students are encouraged to form reading groups. The teacher may take part in discussion as agreed with the students. After written examination the student will get oral feedback.

Assessment practices and criteria, grading scale: The performance in the examination will be graded using a scale 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-305 Chromatography and Other Separation Techniques in Food Analysis, 5cr

Code: FOOD-305

Course status: compulsory or optional: The course is part of the Food Chemistry study module (FOOD-300). The course is available for other students in the Master's Programme in Food Sciences with bachelor level knowledge in food sciences or in chemistry. Priority is given to students choosing the study module of Food Chemistry. Maximum number of students is 30.

Level: MSc, EQF level 7

Recommended time/stage of studies for completion: First year

Term/teaching period when the course will be offered: Periods I-II

Scope of the course in credits: The length of the course, 5 credits, equals circa 130 hours of study. 5

Teacher coordinating the course: Mari Lehtonen

Learning outcomes:

- Principles of chromatography theory
- Principles of gas chromatographic, liquid chromatographic and
- Other separation techniques
- Sample pretreatment for chromatographic analysis
- Different parameters affecting the separations
- Selection of column and mobile phase and optimum parameters for separation efficiency
- Selection of detection methods
- Principles of qualitative and quantitative analysis
- Quality evaluation and method validation for food analysis
- Application areas in food science

Course completion methods: The course is organized remotely as flipped classroom including independent studies, exercises and group work each week. Active participation in contact teaching, group work and independent studying are required. Acceptance of group work and assignments.

Prerequisites: The course is available for students with bachelor level knowledge on food sciences and basic knowledge on organic chemistry.

Recommendation for elective studies:

Content: The course will walk through the principles of chromatography theory, gas chromatography, liquid chromatography and other separation techniques providing knowledge on the sample pretreatment, method validation and quality assessment in food analysis. Part 1: Principles of Chromatography Theory, Gas Chromatography, Liquid Chromatography (HPLC, UHPLC), Sample preparation, Special techniques, Quality parameters and Method validation. Part 2: Applications in food science.

Recommended and required literature: Course materials distributed during the course using Moodle.

Activities and teaching methods in support of learning: Flipped classroom including independent studies, exercises and group work.

Assessment practices and criteria, grading scale: Contact teaching, group work, exercises, and independent studies. Acceptance of groupwork and assignments. The performance will be graded using a scale of 0-5. Evaluation criteria are available in Moodle.

Language of instruction: The course will be given in English. Students may use Finnish or Swedish in their assignments. / Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

Additional information: Course is alternative to KEM331 Separation Techniques as part of the Food Chemistry Module.

FOOD-401 European Food Safety, 5 cr

Code: FOOD-401

Course status: compulsory or optional: The course is compulsory in the Food Safety study module and optional for other master's students.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Period III, even years only

Scope of the course in credits: 5

Teacher coordinating the course: Marina Heinonen

Learning outcomes: After completing the course the student has a wide knowledge on all aspects relevant to food safety in Europe.

Course completion methods: Contact teaching 26 h, assignments 53 h, self study 54 h.

Prerequisites: -

Recommended optional studies: -

Content: European food safety including legislation, safety evaluation, and measures of risk management and control regarding chemical and biological safety, labelling & nutrition, food improvement agents, novel foods, animal feed, animal by products, food waste, and horizontal topics related to food safety.

Recommended and required literature: Material will be provided via Moodle. http://ec.europa.eu/food/safety_en

Assessment practices and criteria, grading scale: Literature examination 80%, assignments 20%. The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-402 Chemical Risk Factors, 5 cr

Code: FOOD-402

Course status: compulsory or optional: The course is compulsory in the Food Safety study module and optional for other master's students with bachelor level knowledge in chemistry.

Level of the course: 7

Recommended time/stage of studies for completion: Master studies

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 5

Teacher coordinating the course: Velimatti Ollilainen

Learning outcomes: After completing the course the student understands the main chemical risk factors related to foods and environment, their history and present situation. Students have the knowledge about the current trends of chemical hazards and are able to estimate their relevance to the food safety in the production chain.

Course completion methods : Contact teaching 40 h, self study 92 h

Prerequisites: good knowledge in chemistry is recommended

Recommended optional studies

Content: Chemical hazards: structures, reactivity, analytical methods, occurrence in foods or feeds. Significance for human health i.e chemical safety occurrence, dietary intake. Environmental aspects. Basics and introduction food control system and rapid alert system (RASFF). Persistent organic pollutants POPs, harmful heavy metals, effect of food processing, natural harmful components, food irradiation and radioactive residues.

Recommended and required literature (recommended or/and compulsory clearly separated): lecture materials in Moodle

Activities supportive for learning: reading the supporting materials in Moodle, lecture will be recorded (videos)

Assessment practices and criteria, grading scale: examination, graded using a scale of 0-5

Language of instruction: English

Additional information: Course includes a visit to Finnish Food Safety Authority EVIRA. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-403 Food Toxicology and Risk Assessment, 5 cr

Code: FOOD-403

Course status: compulsory or optional: The course is compulsory in the Food Safety study module. The course is available for students with bachelor level knowledge in food sciences.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Period IV, odd years only

Scope of the course in credits: 5

Teacher coordinating the course: Marina Heinonen

Learning outcomes: After completing the course the student has a basic knowledge of food toxicology and of the principles of risk assessment concerning food and food ingredients. The student will be able to search for relevant safety evaluations and read and understand the scientific opinions regarding evaluation of food safety.

Course completion methods: Lecture series + written essay, contact teaching 30 h, self study 103 h.

Prerequisites: Bachelor level knowledge in food sciences

Content: Basic principles of toxicology, ADME (absorption, distribution, metabolism, excretion), exposure, food allergy, examples of safety evaluation of vitamins, novel foods, food additives, flavourings, botanical substances, and contaminants.

Recommended and required literature: Material provided during the course with links to relevant web-pages (e.g. EFSA, EU commission). Supportive reading: Püssa, T. 2014. Principles of Food Toxicology. 2nd ed. CRC Press. Chapters 1-6.

Activities supportive for learning:

Assessment practices and criteria, grading scale: Literature examination 80 %, written essay 20 %. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-404 Literature Exam, Food Safety, 5 cr

Code: FOOD-404

Course status: compulsory or optional: The course is compulsory in the Food Safety study module. The course is available for students with bachelor level knowledge in food sciences or relevant knowledge.

Level: 7

Recommended time/stage of studies for completion: 2nd year

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 5

Teacher coordinating the course: Marina Heinonen

Learning outcomes: After completing the examination the student will have a wide understanding of food toxicology.

Course completion methods: Self study 133 h.

Prerequisites: Bachelor level knowledge in Food Sciences

Content: Principles of food toxicology.

Recommended and required literature: Püssa, T. 2014. Principles of Food Toxicology. 2nd ed. CRC Press.

Activities supportive for learning: -

Assessment practices and criteria, grading scale: The grade is based on examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kirjallisuuskulustelun voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-601 Extrusion, 5 cr

Code: FOOD-601

Course status: compulsory or optional: The course is mainly available for those students in the Food Sciences Master's Programme who choose the Food Technology study module with a master's thesis included. The course is available for other students with bachelor level knowledge in Food Sciences.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 5

Teacher coordinating the course: Kirsi Jouppila

Learning outcomes: After the course the student can explain the working principle of extrusion and the effects of extrusion parameters on the properties of extrudates. Group working skills are intended learning outcomes of this course, and the student will get an experience how teaching of a part of course content to the others affects her/his own learning. The student can apply response surface methodology in studying the effects of extrusion parameters, analyse the results and report the study.

Course completion methods: Contact teaching 16 h, practical work 12 h, group work 30 h, self study 75 h. Participation in group work and laboratory work. Attendance at 90% of teaching seminars is compulsory.

Prerequisites: Food Processing Technology or equivalent knowledge.

Content: Extruders with working principles and applications. Effects of extrusion parameters on the properties of extrudates.

Recommended and required literature: Literature and study realisation will be described at the first course meeting.

Activities supportive for learning: Group work, teaching given by the students, practical laboratory work, statistical analyses.

Assessment practices and criteria, grading scale: The grade is based on examination (40%), group work (30%) and laboratory report (30%). The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä. Priority is given to students writing master's thesis within Food Technology study module. Maximum number of students is 16.

FOOD-602 Food Structure, lab work, 3 cr

Code: FOOD-602

Course status: compulsory or optional: The course is compulsory or optional for Food Sciences master's students depending on the study modules. The course is available for other students with bachelor level knowledge in Food Sciences. As prerequisite, the student must enroll in the Food Structure lectures at the same time as, or prior to the Food Structure, Lab Work.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period II

Scope of the course in credits: 3

Teacher coordinating the course: Hanna Koivula

Learning outcomes: After the course, the student can plan and conduct basic measurement of food structure and rheology and evaluate the results.

Course completion methods: Practical laboratory works and oral presentation of the results (both compulsory attendance), written reports.

Prerequisites: Bachelor level knowledge in food sciences.

Recommended optional studies:

Content: Measuring systems and principles, methods in analysis of food structure and rheological characteristics, analysis of measurement data.

Recommended and required literature (recommended or/and compulsory clearly separated): Background information and instructions will be available at Moodle page.

Activities supportive for learning (student's activities, teacher's actions)

Assessment practices and criteria, grading scale: Written reports (90%) and oral presentation (10%). The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: As pre-requisite, the student must enroll in the Food Structure Lectures at the same time as, or prior to Food Structure Laboratory Works. Priority given to students writing master's thesis within Food Technology, Meat Science and Technology, Dairy Science and Technology, or Grain Sciences and Technology study modules. Maximum number of students 20. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-603 Packaging Technology, lab work, 3 cr

Code: FOOD-603

Course status: compulsory or optional: The course is elective in the Food Technology and Product Development in the Food sector study modules. It is highly recommended if the student plans to carry out their M.Sc. thesis in packaging technology related topic.

Level: 7

Recommended time/stage of studies for completion: 1st year (recommended).

Term/teaching period when the course will be offered: Periods I and II

Scope of the course in credits: 3

Teacher coordinating the course: Hanna Koivula

Learning outcomes: After the course, the student can analyze properties of packaging materials and interactions between food and packaging using laboratory experiments. The student can report the results according to the scientific practice and evaluate their significance from the food packaging perspective.

Course completion methods: Laboratory exercises with written reports and oral presentation.

Preceding studies: ETK-250 Pakkausteknologian perusteet or equivalent basic knowledge of food packaging technology (on record) or FOOD-118 Literature Examination, Packaging Technology (available directly at the beginning of the term, for international and Finnish M.Sc. program students). Simultaneous or preceding participation at the FOOD-604 Advanced Lectures in Packaging Technology.

Recommended optional studies:

Content: Laboratory exercises: measuring the mechanical and barrier properties of packaging materials, heatsealing, modified atmosphere packaging and shelf life.

Recommended and required literature: Literature assigned at the laboratory work and independently searched literature.

Activities supportive for learning: Laboratory work, data acquisition, reporting and discussing the results according to the principles of scientific writing.

Assessment practices and criteria, grading scale: Attendance at the laboratory work and reports 100%.

Language of instruction: English

Additional information: Maximum number of students is 18. Priority will be given to students choosing the Food Technology or the Product Development in the Food Sector (Tuotekehitys elintarvikealalla) study module or those with already completed FOOD-604 course.

FOOD-604 Advanced Lectures in Packaging Technology, 2 cr

Code: FOOD-604

Course status: compulsory or optional: The course is elective in the Food Technology and Product Development in the Food sector study modules. It is highly recommended if the student plans to carry out their M.Sc. thesis in packaging technology related topic.

Level: 7

Recommended time/stage of studies for completion: 1st year (recommended).

Term/teaching period when the course will be offered: Periods I and II.

Scope of the course in credits: 2

Teacher coordinating the course: Hanna Koivula

Learning outcomes: The student connects relevant scientific theories with practical applications in food packaging technology. After the course, the student can differentiate the key interactions between food, packaging, and environment, and is able to interpret the significance of material properties and to evaluate the functionality of packaging.

Course completion methods: Lectures and assignments.

Preceding studies: ETK-250 Pakkausteknologian perusteet or equivalent basic knowledge of food packaging technology (on record) or FOOD-118 Literature Examination, Packaging Technology (available directly at the beginning of the term, for international and Finnish M.Sc. program students. The ETK250 is highly recommended for all Finnish speaking students.

Recommended optional studies:

Content: Barrier properties of packaging materials, modified atmosphere packaging, active packaging, aseptic packaging, biodegradable packaging materials.

Recommended and required literature: Literature assigned at lectures.

Activities supportive for learning: Lectures introduce the theoretical background and group assignments deepen the learning.

Assessment practices and criteria, grading scale: Assignments (40%), final examination (60%).

Language of instruction: English

Additional information: Attendance at lectures is highly encouraged due to the types of lecture assignments and activities. Kurssin voi suorittaa myös suomen kielellä. Kurssin voi avluggas också på svenska.

FOOD-605 Potential Novel Methods and Technologies, 5 cr

Code: FOOD-605

Course status: compulsory or optional: The course is elective in the Food Technology study module and optional for other Food Sciences master's students. The course is available for other students with bachelor level knowledge in Food Sciences.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period IV, every year.

Scope of the course in credits: 5

Teacher coordinating the course: Laila Seppä

Learning outcomes: After the course the student can describe the working principle of several novel processing technologies and explain how the technologies influence food material, e.g., microorganisms, enzymes, sensory properties and shelf-life. The student can evaluate their major advantages over conventional technologies and major limitations of use as well as give illustrative examples on the use of the technologies in specific food processing applications. The students will gain understanding of selected research methods with which ingredients and processes can be studied.

The student, under light-supervision, learns to explore data sources and formulate these in oral seminar presentations and written reports. The student learns on designing and implementing a research plan. Also, the principles of peer-reviewing and opposing and their roles in scientific communication will be discussed. Group and project working skills are intended learning outcomes of this course.

Course completion methods: Contact teaching 14 h, group work 50 h, self study 69 h. Participation in group work. Attendance at 80% of seminars and group meetings with the teachers is compulsory.

Prerequisites: Food Processing Technology or equivalent knowledge.

Content: Several novel food processing technologies and research methods.

Recommended and required literature: Literature and study realisation will be described at the first course meeting.

Activities supportive for learning: Prereadings, group work, presentations. Students will study the literature related to a potential novel food processing technology, write a report on the technology and teach it to other students in the class as well as act as opponent to the other group.

Assessment practices and criteria, grading scale: The grade is based on examination (50%) and group work including reports, oral presentations and acting as an opponent (50%). The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä. Priority is given to students choosing the Food Technology study module.

FOOD-607 Food Solutions Master Class, 15 cr

Code: FOOD-607

Is the course compulsory or optional: The course is elective in the Food Technology and Product Development in the Food sector study modules.

Level of the course: MSc (7), BSc (6), and doctoral students can be accepted on the course.

Recommended time/stage of studies for completion: according to the personal study plan

Term/teaching period when the course will be offered: Every other year, periods III-IV and periods I-II during the next academic year. The course lasts whole calendar year.

Scope of the course in credits: 15

Teacher coordinating the course: Kirsi Mikkonen, Hanna Koivula, Laila Seppä

Learning outcomes: After completing the course, the student has skills needed for food product development as part of a multidisciplinary team. She/he is able to consider food design and development from technological, nutritional, safety, and economic perspectives, applying scientific knowledge and collaborating with experts with different backgrounds. The student has presentation and pitching skills.

Course completion methods: Contact teaching 20%, Group work 80%

Prerequisites: Preceding studies in food science, nutrition, chemistry, microbiology, economics, or consumer sciences

Recommended optional studies: Food science

Content: Case study on design and development of a food product in multidisciplinary groups. Practical group work and supporting lectures.

Recommended and required literature (recommended or/and compulsory clearly separated): According to the case study.

Activities supportive for learning (student's activities, teacher's actions): Each student has their own active role in the groups. One of the students in each group acts as group leader. Teachers will provide supporting lectures and act as mentors.

Assessment practices and criteria, grading scale: The grade will be based on the student's performance as team member, report, and final developed product.

Language of instruction: English

Additional information: Students are selected on the course based on their CV, personal study plan, and motivation letter.

FOOD-608 Literature Exam, Food Technology, 2-6 cr

Code: FOOD-608

Course status: compulsory or optional: The course is elective for Food Sciences master's students writing master's thesis within the Food Technology study module.

Level: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 2-6

Teacher coordinating the course: Kirsi Mikkonen

Learning outcomes: The student will have the profound knowledge of Food Technology.

Course completion methods: Self study 54-162 h.

Prerequisites: Food Processing Technology or equivalent knowledge.

Content: Food Technology.

Recommended and required literature: Literature will be agreed.

Activities supportive for learning:

Assessment practices and criteria, grading scale: The grade is based on examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Former code FOOD-606. Kirjallisuuskulustelun voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-701 Food Crop Quality, 3 cr

Code: FOOD-701

Course status: compulsory or optional: The course is compulsory in the Grain Science and Technology study module. The course is

available for other students with bachelor level knowledge in food sciences.

Level of the course: 7

Recommended time/stage of studies for completion: 1st or 2nd year

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 3

Teacher coordinating the course: Frederick Stoddard

Learning outcomes: Students will understand the factors determining quality in the main field crops, their chemistry and biochemistry, and how they are affected by the environment. The student will understand the end-use quality criteria for cereal grains, legumes and oilseeds as applied in the grain trade and industry. The student will learn the theory and principles behind the analytical methods used on food crops. Students will be able to generalize about the factors that determine a given quality attribute in different crops and then seek specifics relevant to an individual crop.

Course completion methods: Lecture series, contact teaching 30 h, practical work 0 h, group work 0 h, independent study 51 h

Prerequisites: Bachelor level knowledge in food sciences.

Recommended optional studies: None

Contents: Introduces the most important quality aspects of the main crops, including the main cereals, and methods of assessing quality: what components determine quality for a given end use, how these are determined genetically and how they may be affected by growing conditions. Theoretical background of methods.

Recommended and required literature: Required reading will include primary articles, review articles and book chapters that will be available on the Moodle page, and selected chapters from the *Encyclopedia of Food Grains, 2nd Edition*, eds. Wrigley, C., Corke, H., Seetharaman, K., and Faubion, J., Academic Press, Oxford, UK (available online within the University).

Activities supportive for learning (student's activities, teacher's actions)

Assessment practices and criteria, grading scale: Examination 80%, lecture participation 20%. The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä. The lectures of this course coincide with those of Field Crop Quality (AGRI-241), so credit cannot be gained for both courses.

FOOD-702 Cereal Processing, 5 cr

Code: FOOD-702

Course status: compulsory or optional: The course is compulsory in the Grain Science and Technology study module. The course is available for other students with bachelor level knowledge in food sciences.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period III

Scope of the course in credits: 5

Teacher coordinating the course: Kati Katina

Learning outcomes: After the course, the student will know and understand the technologies of flour milling and various breadmaking procedures. The student will be able to evaluate raw materials, ingredients, processes and products in terms of quality and feasibility for various products and applications. The student will know and understand the technologies of malting and brewing. The student will also know wet milling and various pulse or legume processes.

Course completion methods : Lecture series, contact teaching 35 h, self study 93 h, individual assignment 7 h.

Prerequisites: Bachelor level knowledge in food sciences. As prerequisites, ETK123, ETK215 or corresponding are required. For those students, such as incoming international students, who have not taken these courses, a test will be arranged: please contact the responsible person.

Recommended optional studies: Food Crop Quality and Cereal and Pulse Ingredient Functionality

Content: Wheat flour milling. Rye and oat milling. Bakery processes and baking techniques including dough handling and dough rheology, fermentations, ingredients and their functions, baking and ovens, methods to combat staling and spoilage. Gluten-free baking.

Starch production/ wet milling. Legume processes, soya bean processing; soymilk/tofu production. Oral presentation and written report on a specific topic.

Recommended and required literature (recommended or/and compulsory clearly separated): Material provided during the course. Wheat Flour Milling, Posner & Hibbs, 2005, AACC. Principles of Breadmaking, Sluimer, 2005, AACC. Pyler & Gorton 2009, Baking Science & Technology. Sosland. Delcour & Hoseney 2010. Principles of Cereal Science and Technology, AACCI Press.

Activities supportive for learning (student's activities, teacher's actions)

Assessment practices and criteria, grading scale: Examination (70%), presentation and reports (30%). The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-703 Grain Technology, lab works, 5 cr

Code: FOOD-703

Course status: compulsory or optional: The course is compulsory in the Grain Science and Technology study module. The course is available for other students with bachelor level knowledge in food sciences.

Level of the course: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period IV

Scope of the course in credits: 5

Teacher coordinating the course: N.N.

Learning outcomes: After the course, the student can plan and conduct basic measurement of grain trade quality and cereal product quality and evaluate the results. The student can conduct laboratory methods applied in the research of grain science and technology.

Course completion methods: Practical laboratory works (compulsory attendance), written reports.

Prerequisites: Bachelor level knowledge in Food Sciences. As prerequisite, the student must enroll Food crop quality, Cereal and Pulse Ingredient Functionality and Cereal Processing prior to the course.

Recommended optional studies:

Content: Experimental, rheological and analytical methods applied in grain science and technology research, trade and industry.

Recommended and required literature (recommended or/and compulsory clearly separated): Background information and instructions will be provided during the course at the Moodle. Delcour & Hoskeney 2010. Principles of Cereal Science and Technology, AACCI Press. Seed Proteins. Shewry, P. R. & Casey, R. Kluwer Academic Publisher, 1999 (E-Books). Carbohydrate Chemistry for Food Scientists. Whistler & BeMiller, Eagan Press, 1997. Enzymes Mathewson, Eagan Press 1998.

Activities supportive for learning (student's activities, teacher's actions)

Assessment practices and criteria, grading scale: Written reports (90%) and laboratory diary book (10%). The performance will be graded using a scale of 0-5

Language of instruction: English

Additional information: Priority is given to students writing master's thesis within Grain Science and Technology study module. Maximum number of students 10. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-704 Literature Exam, Grain Science and Technology, 4 cr

Code: FOOD-704

Course status: compulsory or optional: The course is compulsory for Food Sciences master's students writing master's thesis within the Grain Science and Technology study module.

Level: 7

Recommended time/stage of studies for completion: 2nd year

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 4

Teacher coordinating the course: Kati Katina

Learning outcomes: The student will have the profound knowledge of Grain Science and Technology.

Course completion methods: Self study 133 h.

Prerequisites:

Content: Grain Science and Technology.

Recommended and required literature: Cereal Processing (ET730/ FOOD-702) and Grain and Pulse ingredient Functionality (ET710/FOOD-110) completed or corresponding studies. Student will select approximately 700 pages of scientific text (book, or several books) related to grain science and technology with prior agreement with responsible professor. Selection can be based on student's own interests or needs.

Activities supportive for learning:

Assessment practices and criteria, grading scale: The grade is based on examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: Kirjallisuuskulustelun voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-706 Problem-Based Learning in Grain Science and Technology Research, 5 cr

Code: FOOD-706

Course status: compulsory or optional: The course is recommended to Grain Science and Technology students.

Level: 7

Recommended time/stage of studies for completion: 1st- 2nd year

Term/teaching period when the course will be offered: Period I -II

Scope of the course in credits: 5

Teacher coordinating the course: NN and Kirsi Jouppila

Learning outcomes: Student can use the problem-based learning approach to study challenging questions in grain science and technology. Student learns to explore scientific data sources, make research plans and execute small research works. After the

course the student can plan and carry out a study to solve clearly outlined, small research problem and report the study orally and in writing.

Course completion methods: Contact teaching 10 h - group work 50 h - self study 75.

Prerequisites: BSc in food science, or 100 cr studies of relevance in food science

Recommended optional studies: -

Content: Problem-based learning method applied, working in a group. Literature search, writing an own research plan and executing a one week (at most) laboratory research work. Writing a poster and giving an oral presentation at the Helmi Colloquio, Grain Science and Technology Student - Alumni meeting.

Recommended and required literature: Literature searched on a topic related with the given question.

Activities supportive for learning: Problem solving in group, reporting orally and in writing.

Assessment practices and criteria, grading scale: The grading using scale 0-5

Language of instruction: English

Additional information: The course is available only for students carrying out their theses within study module of Grain Science and Technology. Kurssin voi suorittaa myös suomen tai ruotsin kielellä.

FOOD-801 Meat Technology, lectures, 5 cr

Code: FOOD-801

Course status: compulsory or optional: The course is compulsory in the Meat Science and Technology study module. The course is available for other students with advanced knowledge in meat science (Meat Science lectures course or similar) and basic knowledge in meat technology.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period III

Scope of the course in credits: 5

Teacher coordinating the course: Per Ertbjerg

Learning outcomes: A deep understanding of how animal physiology, muscle/meat biochemistry and microbiology affect the meat quality. Additionally, a thorough understanding of the unit operations in meat technology and their effects on fresh meat and meat product quality.

Course completion methods: Contact teaching 36 h, seminars 12 h, written essays, self-study 86 h

Prerequisites: Meat Science lectures course or similar and basic knowledge in meat technology

Recommended optional studies:

Content: Lectures and seminars covering animal handling and transport, slaughter, cutting, unit operations and the preparation of meat products.

Recommended and required literature: Feiner, G. 2006. Meat Products Handbook, CRC Woodhead Publ. In Food Science, Technology and Nutrition, selected parts. ISBN: 9780849380105. Additional material will be distributed.

Activities supportive for learning:

Assessment practices and criteria, grading scale: Attendance to lectures and seminars, literature examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information:

FOOD-802 Meat Science, lab work, 5 cr

Code: FOOD-802

Course status: compulsory or optional: The course is compulsory in the Meat Science and Technology study module.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period I

Scope of the course in credits: 5

Teacher coordinating the course: Per Ertbjerg

Learning outcomes: To know the most important research and quality control procedures for meat and meat products and experience in performing essential analysis

Course completion methods: Contact teaching 12 h, practical work 80 h, group work 10 h, self-study 32 h

Prerequisites: Meat Science, lectures course taken simultaneously or earlier

Recommended optional studies:

Content: Meat and meat product analysis in relation to chemical, biochemical, histochemical and physical properties

Recommended and required literature: Laboratory manual

Activities supportive for learning:

Assessment practices and criteria, grading scale: Reports on practical work (50%) and examination (50%). The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: The maximum number of students in this course is 10. Priority will be given to students writing master's thesis in the Meat Science and Technology study module.

FOOD-803 Meat Technology, processing lab, 5 cr

Code: FOOD-803

Course status: compulsory or optional: The course is compulsory in the Meat Science and Technology study module.

Level: 7

Recommended time/stage of studies for completion: 1st year

Term/teaching period when the course will be offered: Period III or IV (possibly every other year)

Scope of the course in credits: 5

Teacher coordinating the course: Per Ertbjerg

Learning outcomes: Knowledge of the basic processes in the meat industry and their theoretical background as well as an understanding of the relationship between the meat material and the processes and application of the methods for in-house control

Course completion methods: Contact teaching 12 h, practical work 80 h, group work 10 h, self-study 32 h

Prerequisites: Meat Science lectures course, Meat Science practical work and also the Meat Technology lecture course taken simultaneously or earlier

Recommended optional studies:

Content: Industrial meat processes with focus on manufacturing of meat products, quality management, recipe calculation and product development

Recommended and required literature: Laboratory manuals, legislation

Activities supportive for learning:

Assessment practices and criteria, grading scale: Participation in activities, evaluation of performance and reports on practical work. The overall performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information: The maximum number of students in this course is 10. Priority will be given to students writing master's thesis in the Meat Science and Technology study module.

FOOD-804 Literature Exam, Meat Science and Technology, 5 cr

Code: FOOD-804

Course status: compulsory or optional: The course is compulsory in the Meat Science and Technology study module.

Level: 7

Recommended time/stage of studies for completion: Recommended at 2nd year with the first part at the start of the MSc thesis and the second part at the end

Term/teaching period when the course will be offered: Periods I-IV

Scope of the course in credits: 5

Teacher coordinating the course: Per Ertbjerg

Learning outcomes: The first part aims at giving a holistic approach of Meat Science & Technology study module and the material contained therein. The second part aims at strengthening the scientific awareness and interest in the area.

Course completion methods: Contact teaching 2 h, self-study 132 h

Prerequisites: Meat Science and Meat Technology courses

Recommended optional studies:

Content: Study material covering meat structure, meat quality, animal handling and transport, slaughter, cutting, unit operations, meat microbiology and the preparation of meat products.

Recommended and required literature: Price, J.F. & Schweigert, B.S. The Science of Meat and Meat Products. W.H. Freeman & Co., San Francisco 1987. One or two additional books to be arranged individually.

Activities supportive for learning:

Assessment practices and criteria, grading scale: Literature examination. The performance will be graded using a scale of 0-5.

Language of instruction: English

Additional information:

VIKIM-001 Master's Maturity test, 0 cr

Content:	Kypsyysnäyte on opinnäytteen alaan liittyvä tieteellinen kirjallinen teksti, esimerkiksi tutkielma tai sen tiivistelmä. Kypsyysnäytteen hyväksyy kieltä taitava koulutusohjelman opettaja, esimerkiksi tutkielman ohjaaja. Kypsyysnäyte on erillinen opintasuoritus, josta ei kuitenkaan anneta opintopisteitä. Suorittamalla kypsyysnäytteen koulusivistyksensä kielellä opiskelija osoittaa julkisyhteisöjen henkilöstöltä vaadittavasta kielitaidosta annetun lain (424/2003) 6 §:n 1 momentin mukaisen erinomaisen kielitaidon. Mikäli opiskelija on osoittanut asetuksen mukaisen kielitaitonsa kypsyysnäytteessä alemmassa korkeakoulututkinnossaan, hänen ei tarvitse osoittaa kielitaitoa enää ylemmässä korkeakoulututkinnossa
Assessment practices and criteria, grading scale:	Kypsyysnäyte arvioidaan asteikolla hyväksytty/hylätty; Pass-Fail
Course completion methods:	Kypsyysnäyte on suomeksi tai ruotsiksi kirjoitettu opinnäytteen alaan liittyvä tieteellinen kirjallinen teksti. Opiskelija, joka on saanut koulusivistyksensä muulla kuin suomen tai ruotsin kielellä tai saanut koulusivistyksensä ulkomailla, kirjoittaa kypsyysnäytteensä suomeksi, ruotsiksi tai englanniksi. Monikielisissä maisteriohjelmissa englanninkielellä opiskelevat kirjoittavat kypsyysnäytteen englanniksi.

EQUIVALENCE TABLE / VASTAAVUUSTAULUKKO

Elintarviketieteiden maisteriohjelma, Master's Programme in Food Sciences						
Koodi Code	Vanhan tutkintorakenteen (2016-2017) opintokokonaisuus tai kurssi / Course or study entity according to the old (2016-2017) degree requirements	op cr	Koodi Code	Uuden tutkintorakenteen opintokokonaisuus tai kurssi / Course or study entity according to the new degree requirements	120 op cr	Vastaava opettaja tai yksikkö / Teacher Unit
				Tieteenalan opinnot - Discipline- specific studies		
Koodi	SYVENTÄVÄT OPINNOT	op	Koodi	Food Sciences core studies	60 op cr	
8720124 (ET410)	Conventional Processing Technologies	5	FOOD-101	Food Processing Technology	3	Laila Seppä
8720112 (ET820)	Food Structure, lectures	2	FOOD-102	Food Structure, lectures	3	Tuula Sontag- Strohm
87148 (EK365)	Food Additives	3	FOOD-103	Food Additives	5	Marina Heinonen
87172 (EK355)	Seminaarit	3	FOOD-104	Seminars in Food Sciences	3	Laila Seppä
tai 8720114 (ET885)	Seminaarit	4				
			FOOD-100	Master's thesis	30	
			FOOD-001	Maturity exam	0	

	Ei korvaavuutta		FOOD-105	Research Exercise in Food Sciences	6-10	
87145 (EK364)	Vitamiinit ja muut bioaktiiviset yhdisteet	5	FOOD-106	Vitamins and Other Bioactive Substances	5	Susanna Kariluoto
850004 (EK322)	Soveltava orgaaninen kemia/ Applied Organic Chemistry	6	FOOD-107	Organic Chemistry in Food Sciences*	5	Ndegwa Maina
85035 (EK325)	Orgaaninen rakenneanalyysi	4	FOOD-108	Organic Structure Analysis *	5	Ndegwa Maina
8720118 (ET330)	Food Fermentation Technology	3-4	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
tai 882593 (BIOT400)	Bioresource and food enzymology	5				
8720143 (ET710)	Cereal and Pulse Ingredient Functionality	2	FOOD-110	Cereal and Pulse Ingredient Functionality*	2	Tuula Sontag-Strohm
8720301 (ET331)	Dairy Science and Technology 1	2	FOOD-111	Dairy Science and Technology 1*	2	Tapani Alatossava
tai 8720135 (ETT331)						
8720136 (ET332)	Dairy Science and Technology 2	2	FOOD-112	Dairy Science and Technology 2 *	2	Tapani Alatossava
tai 8720302 (ETT332)						
8720130 (ET510)	Meat Science, lectures	5	FOOD-113	Meat Science, lectures *	5	Per Erthberg
840021 (EK320)	Laboration laadunvalvonta/Laboratory quality assurance	3	FOOD-114	Experimental Design and Quality Control	5	Laila Seppä
87176 (EK340)	Tutkimusharjoittelu	1	FOOD-115	Practical Training in Food Sciences	2-4	Per Erthberg Hanna Koivula Velimatti Ollilainen Tuula Sontag-Strohm Pekka Varmanen
tai 8720115 (ET890)	Harjoittelu 2	2				
840015 (ET245)	Aistinvaraisen tutkimuksen jatkokurssi	5	FOOD-116	Advanced Sensory Science	5	Mari Sandell
8720126 (ET450)	Pakkausteknologian syventävät luennot	2	FOOD-604	Advanced Lectures in Packaging Technology	2	Hanna Koivula
864073 (MIKRO575)	Elintarvike- ja ympäristöhygienian ja valvonta	5	MMB-302	Food and environmental hygiene and control	5	Per Saris
tai 864989 (MIKRO576)	tai Food and environmental hygiene and control	5				
			FOOD-117	Literature Exam, Sensory Science	5	Mari Sandell
			FOOD-119	Literature Exam, Packaging Technology	5	Hanna Koivula
			FOOD-118	Literature Exam, Packaging Technology	3	Hanna Koivula
			FOOD-121	Practical Teaching Training	1-10	
				Oman alan erikoistumisopinnot - Elective study modules according to the specialization	25 op cr	
			FOOD-300	Food chemistry	25 op cr	Vieno Piironen
			KEM331	Separation techniques	5	
871062 (EK321)	Elintarvikekemiallinen tutkimus	3	FOOD-301	Research in Food Chemistry	2	Vieno Piironen
87163 (EK331)	Tutkimusmenetelmät	8	FOOD-302	Research Methods in Food Chemistry	8	Susanna Kariluoto
87131 (EK310)	Elintarvikekemian kuulustelu	8	FOOD-303	Literature Exam 1, Food Chemistry	5	Vieno Piironen

87129 (EK136)	Elintarvikekemian projektityöskentely	1-4	FOOD-120	Working in a Research Group	1-5	
tai						
8720128 (ET475)	Tutki musharjoitus	5				
871072 (EK362)	Elintarvikkeiden kemialliset vaarat	5	FOOD-402	Chemical Risk Factors	5	Velimatti Ollilainen
87145 (EK364)	Vitamiinit ja muut bioaktiiviset yhdisteet	5	FOOD-106	Vitamins and Other Bioactive Substances	5	Susanna Kariluoto
840021 (EK320)	Laboratorion laadunvalvonta/Laboratory quality assurance	3	FOOD-114	Experimental Design and Quality Control	5	Laila Seppä
87175 (EK360)	Elintarvikekemian erikoiskirjallisuus analytiikan alalta	5	FOOD-304	Literature Examination 2	5	Vieno Piironen
			FOOD-600	Food Technology	25 op cr	Kirsi Mikkonen
8720021 (ETT410)	Conventional Processing Technologies	5	FOOD-601	Extrusion	5	Kirsi Jouppila
8720126 (ET450)	Pakkausteknologian syventävät luennot	2	FOOD-604	Advanced Lectures in Packaging Technology	2	Hanna Koivula
8720113 (ET825)	Food structure, laboratory work	4	FOOD-602	Food Structure, lab work	3	Tuula Sontag-Strohm
8720125 (ET420)	Potential Novel Processing Technologies	5	FOOD-605	Potential Novel Methods and Technologies	5	Laila Seppä
8720118 (ET330)	Food Fermentation Technology	3	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
tai						
882593 (BIOT400)	Bioresource and food enzymology	5				
8720127 (ET455)	Pakkausteknologian harjoitustyöt	3	FOOD-603	Packaging Technology, lab work	3	Hanna Koivula
	new, no old course		FOOD-607	Food solutions master class	15	Kirsi Mikkonen, Hanna Koivula, Laila Seppä
8720143 (ET710)	Cereal and Pulse Ingredient Functionality	2	FOOD-110	Cereal and Pulse Ingredient Functionality	2	Tuula Sontag-Strohm
8720144 (ET730/731)	Cereal Processing 1 and 2	6	FOOD-702	Cereal processing	5	Kati Katina
87176 (EK340)	Tutki musharjoittelu	1	FOOD-115	Practical Training in Food Sciences	2-4	Per Erthberg Hanna Koivula Velimatti Ollilainen Tuula Sontag-Strohm Pekka Varmanen
tai						
8720115 (ET890)	Harjoittelu 2	2				
840021 (EK320)	Laboratorion laadunvalvonta/Laboratory quality assurance	3	FOOD-114	Experimental Design and Quality Control	5	Laila Seppä
8720129 (ET490)	Kirjallisuuskuulustelu	5	FOOD-606 FOOD-608	Literature Exam, Food Technology	4-5 2-6	Kirsi Mikkonen
840015 (ET245)	Aistinvaraisen tutkimuksen jatkokurssi	5	FOOD-116	Advanced Sensory Science	5	Mari Sandell
87129 (EK136)	Elintarvikekemian projektityöskentely	1-4	FOOD-120	Working in a Research Group	1-5	
tai						
8720128 (ET475)	Tutki musharjoitus	5				
			FOOD-800	Meat Science and Technology	25 op cr	Per Erthberg
8720132 (ET530)	Meat Technology, lectures	5	FOOD-801	Meat Technology, lectures	5	Per Erthberg

8720133 (8ET535)	Lihateknologia, prosessiharjoitukset	7	FOOD-803	Meat Technology, processing lab	5	Per Erthberg
8720131 (ET515)	Lihatiede, harjoitustyöt	4	FOOD-802	Meat Science, lab work	5	Per Erthberg
8720134 (ET590)	Kirjallisuuskuulustelu	4	FOOD-804	Literature Exam, Meat Science and Technology	5	Per Erthberg
882093 (RAV093)	Anatomian ja fysiologian perusteet	5	HNFB-111	Anatomian ja fysiologian perusteet	5	Anne-Maria Pajari
8720118 (ET330)	Food Fermentation Technology	3-4 and 4	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
tai						
882593 (BIOT400)	Bioresource and food enzymology	5				
8720113 (ET825)	Food structure, laboratory work	4	FOOD-602	Food Structure, lab work	3	Tuula Sontag-Strohm
864073 (MIKRO575)	Elintarvike- ja ympäristöhygienia ja valvonta	5	MMB-302	Food and environmental hygiene and control	5	Per Saris
tai						
864989 (MIKRO576)	Food and environmental hygiene and control	5				
			FOOD-200	Dairy Science and Technology	25 op cr	Tapani Alatossava
8720138 (ET340)	LAB Starters	3	FOOD-201	LAB Starters and Probiotics	4	Pekka Varmanen
8720139 (ET621)	Nestemäiset maitovalmisteet	6	FOOD-202	Liquid milk products	6	Tapani Alatossava
8720140 (ET622)	Kiinteät maitovalmisteet	8	FOOD-203	Solid milk products	6	Pekka Varmanen
8720142 (ET690)	Literature Exam	4	FOOD-204	Literature Exam, Dairy Science and Technology	4	Tapani Alatossava
87129 (EK136)	Elintarvikekemian projektityöskentely	42826	FOOD-120	Working in a Research Group	1-5	
tai						
8720128 (ET475)	Tutkimusharjoitus	5				
8720118 (ET330)	Food Fermentation Technology	3	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
tai						
882593 (BIOT400)	Bioresource and food enzymology	5				
8720113 (ET825)	Food structure, laboratory work	4	FOOD-602	Food Structure, lab work	3	Tuula Sontag-Strohm
871003 (EK366)	European Food Legislation and Control	3	FOOD-401	European Food Safety	5	Marina Heinonen
864073 (MIKRO575)	Elintarvike- ja ympäristöhygienia ja valvonta	5	MMB-302	Food and environmental hygiene and control	5	Per Saris
tai						
864989 (MIKRO576)	Food and environmental hygiene and control	5				
			FOOD-700	Grain Science and Technology	25 op cr	Kati Katina
812110 (KVIL303)	Field Crop Quality	3	FOOD-701	Food Crop Quality	3	Frederick Stoddard
8720144 (ET730/731)	Cereal Processing 1 and 2	6	FOOD-702	Cereal Processing	5	Kati Katina
8720146 (ET735)	Cereal Technology lab works	4	FOOD-703	Grain Technology, lab works	5	Tuula Sontag-Strohm
8720113 (ET825)	Food structure, laboratory work	4	FOOD-602	Food Structure, lab work	3	Tuula Sontag-Strohm
8720149 (ET790)	Kirjallisuuskuulustelu 2	5	FOOD-704	Literature exam, Grain Science and Technology	4	Kati Katina

8720118 (ET330) tai 882593 (BIOT400)	Food Fermentation Technology Bioresource and food enzymology	3 5	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
8720021 (ETT410)	Conventional Processing Technologies	5	FOOD-601	Extrusion	5	Kirsi Jouppila
8720147 (ET740)	Biobusiness patenting	3	FOOD-705	Biobusiness Patenting	3	Hannu Salovaara
87145 (EK364)	Vitamiinit ja muut bioaktiiviset yhdisteet	5	FOOD-106	Vitamins and Other Bioactive Substances	5	Susanna Kariluoto
87129 (EK136) tai 8720128 (ET475)	Elintarvikekemian projektityöskentely Tutkimusharjoitus	1-4 5	FOOD-120	Working in a Research Group	1-5	
840021 (EK320)	Laboration laadunvalvonta/Laboratory quality assurance	3	FOOD-114	Experimental Design and Quality Control	5	Laila Seppä
87176 (EK340) tai 8720115 (ET890)	Tutkimusharjoittelu Harjoittelu 2	1 2	FOOD-115	Practical Training in Food Sciences	2-4	Per Ertbjerg Hanna Koivula Velimatti Ollilainen Tuula Sontag-Strohm Pekka Varmanen
				Vaihtoehtoiset opintokokonaisuudet / Elective study modules	15-25 op cr	
			FOOD-500	Food Sciences Basics study module	25 op cr	Kirsi Jouppila
			ETK-110	Elintarvikekemian ja -teknologian perusteet	10 op	Vieno Piironen
871002 (ETK 130)	Elintarvikelainsäädäntö ja -valvonta	3	ETK-130	Elintarvikelainsäädäntö ja -valvonta	5	Marina Heinonen
840009 (ETK210)	Elintarvikkeiden fysikaalinen kemia	5	ETK-210	Elintarvikkeiden fysikaaliset ominaisuudet	5	Kirsi Jouppila
840012 (ETK225)	Elintarvikekemiallinen analytiikka, harjoitustyöt	5	ETK-225	Elintarvikekemiallinen analytiikka, harjoitustyöt	5	Susanna Kariluoto, Velimatti Ollilainen
840013 (ETK230)	Elintarvikkeiden makrokomponenttien kemia	6	ETK-230	Elintarvikkeiden makrokomponenttien kemia	5	Anna-Maija Lampi
840014 (ETK240)	Aistinvaraisen tutkimuksen perusteet	5	ETK-240	Aistinvaraisen tutkimuksen perusteet	5	Mari Sandell
840016 (ETK250)	Pakkausteknologian perusteet	5	ETK-250	Pakkausteknologian perusteet	5	Hanna Koivula
840010 (ET215)	Elintarvikesuunnittelu ja -prosessointi	5-10	ETK-215	Elintarvikesuunnittelu ja -prosessointi	5	Laila Seppä
840017 (EK260)	Elintarvikkeiden makrokomponenttien reaktiot ja vuorovaikutukset	5	ETK-260	Elintarvikkeiden makrokomponenttien reaktiot ja vuorovaikutukset	5	Vieno Piironen
			FOOD-400	Food Safety	25 op cr	Marina Heinonen
871003 (E366)	European Food Legislation and Control	3	FOOD-401	European Food Safety	5	Marina Heinonen
871072 (EK362)	Elintarvikkeiden kemialliset vaarat	5	FOOD-402	Chemical Risk Factors	5	Velimatti Ollilainen
871073 (EK363)	Food Toxicology and Risk Assessment	5	FOOD-403	Food toxicology and risk assessment	5	Marina Heinonen
871076 (EK361)	Literature Exam	5	FOOD-404	Literature exam, Food Safety	5	Marina Heinonen

864073 (MIKRO575)	Elintarvike- ja ympäristöhygieniä ja valvonta	5	MMB-302	Food and environmental hygiene and control	5	Per Saris
tai						
864989 (MIKRO576)	Food and environmental hygiene and control	5				
864988 (MIKRO233)	Food Microbiology	4	MMB-301	Food Microbiology –literature examination	5	Per Saris
864067 (MIKRO232)	Elintarvikemikrobiologian laboratoriotyöt	5	MMB-303	Food microbiology - lab course	5	Per Saris
8720118 (ET330)	Food Fermentation Technology	3	FOOD-109	Food Fermentation and Enzyme Technology	5	Kati Katina
tai						
882593 (BIOT400)	Bioresource and food enzymology	5				
			922601	Introduction to bioinformatic tools in food hygiene research	2	
			ELL-429	Molecular methods for detection of food- and waterborne pathogens	3	
			FOOD-900	Product development in the Food Sector (Tuotekehitys elintarvikealalla)	25 op cr	Anna-Maija Lampi, Eeva Lindroth
87054	From Idea to a Product - Introduction to Product Development	5	YET-104	Ideasta tuotteeksi - Tuotekehitys elintarvikealalla	5	Sari Ollila
			EE039	Aineopintojen kirjallisuuskulustelu	5	Sari Ollila
			YET-017	Liiketoimintasuunnitelma	5	Jenniina Sihvonen
			YET-004	Elintarvikemarkkinoinnin perusteet	5	
			YET-107	Laatujohtaminen elintarvikealalla	5	Sari Ollila
			EKM-102	Digitaalinen markkinointi elintarvikealalla	5	Jari Salo
840016 (ETK250)	Pakkausteknologian perusteet	5	ETK-250	Pakkausteknologian perusteet	5	Hanna Koivula
	Ei korvaavuutta		FOOD-119	Literature Exam, Packaging Technology	5	Hanna Koivula
			FOOD-118		3	
8720126 (ET450)	Pakkausteknologian syventävät luennot	2	FOOD-604	Advanced Lectures in Packaging Technology	2	Hanna Koivula
840014 (ETK240)	Aistinvaraisen tutkimuksen perusteet	5	ETK-240	Aistinvaraisen tutkimuksen perusteet	5	Mari Sandell
			FOOD-117	Literature Exam, Sensory Science	5	Mari Sandell
840015 (ET245)	Aistinvaraisen tutkimuksen jatkokurssi	5	FOOD-116	Advanced Sensory Science	5	Mari Sandell
8720012 (ETT230)						
87137 (EK264)	Funktionaaliset elintarvikkeet	3	ETK-264	Funktionaaliset elintarvikkeet	3	Susanna Kariluoto
87148 (EK365)	Food Additives	3	FOOD-103	Food Additives	5	Marina Heinonen
871002 (ETK 130)	Elintarvikelainsäädäntö ja -valvonta	3	ETK-130	Elintarvikelainsäädäntö ja -valvonta	5	Marina Heinonen
871003 (EK366)	European Food Legislation and Control	3	FOOD-401	European Food Safety	5	Marina Heinonen
8720123 (ET810)	Food Processing Technology	3	FOOD-101	Food Processing Technology	3	Laila Seppä
			FOOD-607	Food Solutions Master Class	15	Kirsi Mikkonen, Hanna Koivula, Laila Seppä
Koodi	MUUT OPINNOT	op	Koodi	Työelämä ja asiantuntijuus		
87176 (EK340)	Tutkimusharjoittelu	1	FOOD-115	Practical Training in Food Sciences	2-4	Per Ertbjerg Hanna Koivula Velimatti Ollilainen
tai						

