Master's Programme in Food Sciences, curriculum 2023-2026

Decided at the Faculty council on 18.10.2022

Contents

(note that changes may occur, please check the newest information from Sisu)

MH80_004 Master's Programme in Food Sciences

MH80_004 Elintarviketieteiden maisteriohjelma

MH80_004 Magisterprogrammet i livsmedelsvetenskaper

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	120 cr
Languages	English, Swedish, Finnish
Grading scale	Pass-Fail
Content approval required	no
Locations	Helsinki
University	University of Helsinki
Responsible organisation	Faculty of Agriculture and Forestry 100%
Responsible persons	Hanna Happonen, Administrative person Kirsi Jouppila, Responsible teacher Nina Niemeläinen, Administrative person Tuula Hiltunen, Administrative person
Degree programme type	Master's Degree
Degree titles	Master of Food Sciences

Study field	Fields of education (Ministry of Education and Culture), Agriculture and forestry
Education classification	762301 Master of Food Sciences

Content description (note that links are missing from the text)

EN:

Profile

Your studies in Food Sciences Master's programme will enable you to make an impact on the creation of innovative and sustainable solutions for the whole chain of food production. You will:

- study the theory and applications of the broad area of Food Sciences in lecture courses and in group
  works
- increase your knowledge of food composition, processing, structure and legislation
- deepen your knowledge of how the reactions of different food components, production processes and packaging affect the structure, sensory quality, healthiness and safety of animal and plant based foods
  learn laboratory working skills
- acquire generic academic skills including employment skills for example by training in the food industry.

Skills relevant to employment

The curriculum of Master's programme in Food Sciences includes courses enhancing generic academic skills of the students. In the course FOOD-104 Seminars in Food Sciences themes integrating to Academic University Studies, like career planning, and building expertise are covered. The student may include into her/his degree practical training for example in food industry, practical teaching training or working in a research group. These studies enhance the skills relevant to employment.

International skills

As a student in Food Sciences you have excellent opportunities for an international student exchange or internship. You can also perform part of your degree studies at a university abroad. Due to the instruction in English, many international students on the Viikki campus and the international personnel in the research groups, you will be part of an international community in your daily student life. Master's programme in Food Sciences also participates joint courses like EIT Food Solution courses, such as "2020 Less is More" and "2021 Recover Your Joy of Eating". Such courses will provide students the opportunity to work collaboratively with mentors in multidisciplinary teams, collaborate with international students and travel
to meet the other teams.

More information on studying abroad.

Continuous learning

Persons not enrolled as undergraduate or postgraduate degree students at the University of Helsinki may be granted a right to complete non-degree studies. This right may be granted to enhance the applicant's professional or academic expertise or to incorporate the studies in question in a degree completed at another educational institution.

Supplementary studies (i.e., studies that supplement a degree completed at the University of Helsinki) also count as non-degree studies.

Read more about non-degree studies in the Faculty of agriculture and forestry.

Sustainability expertise

It is recommended that the students who have not completed the Sustainability course (SUST-001, 3 cr) at the Bachelor's level would complete the course at Master's level. Course can be included to the optional studies. The topics related to sustainability are raised in many Master's level courses in Food Sciences.

Criteria for full-time and part-time studies, opportunities for distance learning

Programme includes much laboratory exercises and works which require attendance. Some courses can be completed through distance learning. Studies are planned to be completed in two years of full-time studies.

Practices for collecting and processing student feedback

HowULearn questionnaire 3 and academic year's feedback survey are conducted once during the first year of studies in spring term. During the second year or in the final phase of studies academic year's feedback is

collected. Feedback is discussed at the steering board of the programme and with the students in coop- eration with the student associations. Course feedback is collected from all the courses that provide teach- ing. Students have also possibility to give anonymous feedback of any topics related to the programme with the separate Eform.

Structure

Structure of the degree is shown in the Instructions for students pages.

Order and schedule of completion for studies

Students can utilize timing template in Sisu on the personal study plan's "Timing" sheet.

Learning outcomes

EN: After completing the degree the student has profound understanding on the key elements and theo- ry of Food Sciences and of the first study module (one of the main study modules: Food Chemistry, Food Technology, Dairy Science and Technology and Grain Science and Technology) and of the second study module. 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 eth- ical principles in science. She/he can summarize her/his own Master's thesis 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 her/his own research and writing. The student is prepared for lifelong learning in the role of an expert in Food Sciences.

Additional information

EN:

Job descriptions and sectors of graduates

With a Master's degree in Food Sciences, you can find work for example as a product developer or a prod- uct quality manager in the food industry; as an inspector or a researcher in a food, agricultural or environ- mental control laboratory; as a teacher or researcher at a university or a research institute; as a self-em- ployed entrepreneur; or as an expert in a government ministry or other expert organisation.

Student selection

Read about the admissions from Studyinfo.

Postgraduate study options and opportunities

The Master's degree in Food Sciences gives you qualifications for further scientific education (a doctoral de- gree) in Food Sciences or related sciences.

Read more about Doctoral Programme in Food Chain and Health.

Graduation practices and criteria

Faculty's graduation practices

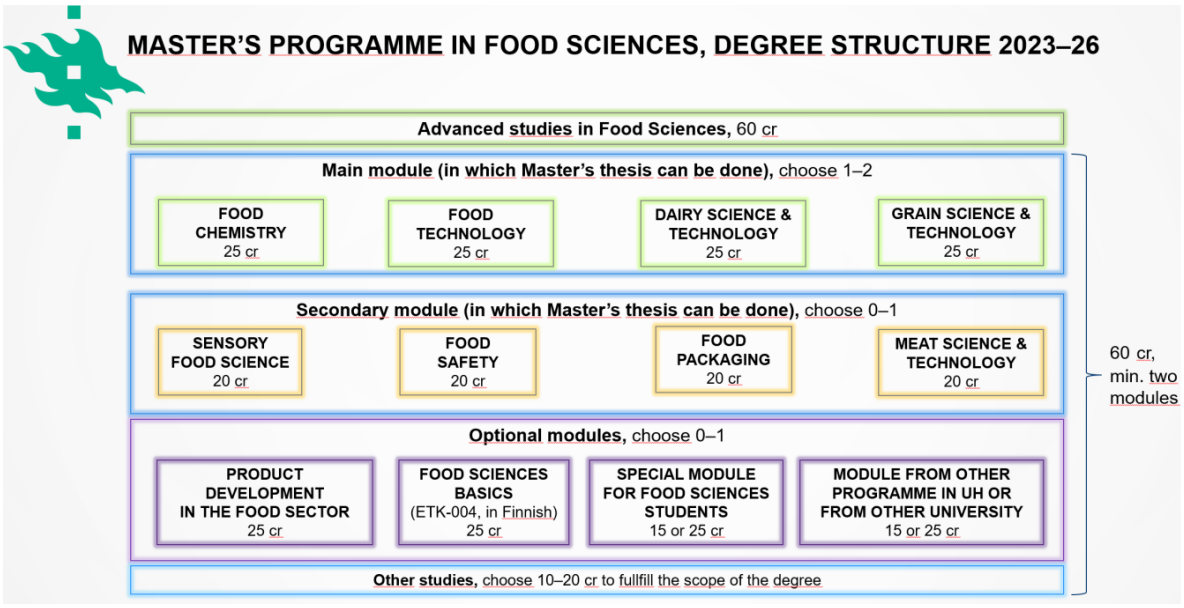
Student supervision

Study planning and supervision is described on the Instructions for students pages. Master's thesis work is started with the course FOOD-105 Research Exercise in Food Sciences. You can read about the supervision practices of the Master's theses in the Instructions for students pages.

Credit transfer instructions

EN: General University of Helsinki guidelines on the recognition of prior learning.

Structure of the degree



STUDY MODULES

FOOD-100 Food Sciences, Advanced Studies

FOOD-100 Elintarviketieteet, syventävät opinnot

FOOD-100 Livsmedelsvetenskaper, fördjupade studier

Abbreviation: Elintarviketiet

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	60 cr
Languages	Finnish, Swedish, English
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	yes
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kirsi Jouppila, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN:

Advanced studies in Food Sciences (60 cr) include core studies 30 cr and Master's thesis & maturity examination 30 cr.

Core studies, 30 cr:

Compulsory, 20 cr:

FOOD-101 Food Processing Technology, 3 cr

FOOD-102 Food Structure, lectures, 3 cr

FOOD-103 Food Additives, 5 cr

FOOD-104 Seminars in Food Sciences, 3 cr

FOOD-105 Research Exercise in Food Sciences, 6 cr

Electives, 10 cr:

FOOD-110 Cereal and Pulse Ingredient Functionality, 2 cr

FOOD-111 Dairy Science and Technology 1, 2 cr and
FOOD-112 Dairy Science and Technology 2, 2cr

FOOD-130 Meat and Meat Analog Science and Technology, 4 cr

FOOD-107 Organic Chemistry in Food Sciences, 5 cr

FOOD-108 Organic Structure Analysis, 5cr

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

Master's thesis & maturity examination, 30 cr

Learning outcomes

EN: After completing the study 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 stud- ies in main and secondary study modules of Food Sciences in one of which she/he has carried out her/his Master's thesis project. 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 Master's thesis 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 her/his own research and writing. The student is prepared for lifelong learning in the role of an expert in Food Sciences.

Prerequisites

EN: Bachelor’s degree studies in Food Sciences or equivalent completed.

Additional information

EN:

Target groups

Compulsory for the students of Master's programme in Food Sciences.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-200 Dairy Science and Technology, Study Module

FOOD-200 Maitotiede ja -teknologia, opintokokonaisuus
FOOD-200 Mjölkvetenskap och -teknologi, studiehelhet

Abbreviation: Maitotiede ja -

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	25 cr
Languages	Finnish, English, Swedish

Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Hanna Happonen, Administrative person Pekka Varmanen, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 20 cr:
FOOD-201 LAB Starters and Probiotics, 5 cr

FOOD-202 Liquid Milk Products, 5 cr

FOOD-203 Solid Milk Products, 5 cr

FOOD-204 Literature Exam, Dairy Science and Technology, 5 cr

Electives, 5 cr:

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

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

FOOD-602 Food Structure, lab work, 3 cr

FOOD-401 European Food Safety, 5 cr

MMB-302 Food and Environmental Hygiene and Control, 5 cr
Other courses may also be included as elective courses according to prior agreement.

Learning outcomes

EN: After completing this main study 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, respec- tively, of high-quality dairy products.

Prerequisites

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

Additional information

EN:

Target groups

The study module is one of the four main study modules with an option to carry out a Master’s thesis. The study module without a Master's thesis is available as a second study module for the students of the Mas- ter’s programme in Food Sciences.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

FOOD-300 Food Chemisty, Study Module

FOOD-300 Elintarvikekemia, opintokokonaisuus

FOOD-300 Livsmedelskemi, studiehelhet

Abbreviation: Elintarvikekemi

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	25 cr
Languages	Finnish, English, Swedish
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Happonen, Administrative person
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 20 cr:
FOOD-305 Chromatographic and Other Separation Techniques in Food Analysis, 5 cr or
KEM331 Separation Techniques, 5 cr

FOOD-301 Research in Food Chemistry, 2 cr **

FOOD-302 Research Methods in Food Chemistry, 8 cr **

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

Electives, 5 cr:

FOOD-120 Working in a Research Group, 1-5 cr
FOOD-106 Vitamins and Other Bioactive Substances, 5 cr

FOOD-402 Chemical Risk Factors, 5 cr

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

**Compulsory only if the Master’s thesis is done in the study module.

Other courses may also be included as elective courses according to prior agreement.

Learning outcomes

EN: After completing this main study module 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.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion. FOOD-107 Organic Chemistry in Food Sciences (5 cr) is compulsory for all. FOOD-108 Organic Structure Analysis (5 cr) is compulsory only if the Master's thesis is done in the Food Chemistry study module.

Additional information

EN:

Target groups

The study module is one of the four main study modules with an option to carry out a Master’s thesis. The study module without a Master's thesis is available as a second study module for the students of the Mas- ter’s

programme in Food Sciences.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-400 Food Safety, Study Module

FOOD-400 Elintarviketurvallisuus, opintokokonaisuus

FOOD-400 Livsmedelssäkerhet, studiehelhet

Abbreviation: Elintarviketurv

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	20 cr
Languages	Finnish, English, Swedish
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Hanna Happonen, Administrative person Marina Heinonen, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 15 cr:
FOOD-401 European Food Safety, 5 cr

FOOD-403 Food Toxicology and Risk Assessment, 5 cr

FOOD-404 Literature Exam, Food Safety, 5 cr

Electives, 5 cr:

FOOD-402 Chemical Risk Factors, 5 cr
MMB-302 Food and Environmental Hygiene and Control, 5 cr
MMB-301 Food Microbiology, book exam, 5 cr **

MMB-303 Food Microbiology, lab course, 5 cr

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

ELL-429 Molecular methods for detection of food- and waterborne pathogens

**Note that ETK-231 and MMB-301 are corresponding courses. If you have accomplished ETK-231, it's not possible to earn credits from MMB-301 and you have to choose some other elective course.

Other courses may also be included as elective courses according to prior agreement.

Learning outcomes

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

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion.

Additional information

EN:

Target groups

The study module is one of the four secondary study modules with an option to carry out a Master's thesis.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-600 Food Technology, Study Module

FOOD-600 Elintarviketeknologia, opintokokonaisuus

FOOD-600 Livsmedelsteknologi, studiehelhet

Abbreviation: Elintarviketekn

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	25 cr
Languages	Finnish, Swedish, English
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Mikkonen, Responsible teacher Hanna Happonen, Administrative person
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 8 cr:
FOOD-602 Food Structure, lab work, 3 cr

FOOD-605 Potential Novel Methods and Technologies, 5 cr

Electives, 17 cr:

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

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

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

FOOD-601 Extrusion, 5 cr

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

Technology courses from Dairy, Grain or Meat Science and Technology study modules or preceding studies of them can be added max. 5 cr to the study module according to agreement with responsible person.

Learning outcomes

EN: After completing this main study 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 study module.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion.

Additional information

EN:

Target groups

The study module is one of the four main study modules with an option to carry out a Master's thesis. The study module without a Master's thesis is available as a second study module for the students of the Mas- ter's programme in Food Sciences.

Recommended time or stage of studies for completion 1st

and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-700 Grain Science and Technology, Study Module

FOOD-700 Viljatiede ja -teknologia, opintokokonaisuus

FOOD-700 Spannmålsvetenskap och -teknologi, studiehelhet

Abbreviation: Viljatiede ja -

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	25 cr
Languages	Finnish, Swedish, English
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	yes
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100% Responsible persons Hanna Happonen, Administrative person
	Kati Katina, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 20 cr:
FOOD-701 Food Crop Quality, 3 cr

FOOD-702 Cereal Processing, 5 cr

FOOD-703 Grain Technology, lab works, 5 cr **

FOOD-602 Food Structure, lab work, 3 cr

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

Electives, 5 cr:

FOOD-706 Problem Solving in Food Research, 5 cr

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

FOOD-601 Extrusion, 5 cr

FOOD-106 Vitamins and Other Bioactive Substances, 5 cr

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

**Compulsory only if the Master's thesis is done in the study module.
Other courses may also be included in the study module according to prior agreement.

Learning outcomes

EN: After completing this main study 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.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion. FOOD-110 Cere- al and Pulse Ingredient Functionality (2 cr)

Additional information

EN:

Target groups

The study module is one of the four main study modules with an option to carry out a Master's thesis. The study module without a Master's thesis is available as a second study module for the students of the Mas- ter's programme in Food Sciences.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-800 Meat Science and Technology, Study Module

FOOD-800 Lihatiede ja -teknologia, opintokokonaisuus
FOOD-800 Köttvetenskap och -teknologi, studiehelhet

Abbreviation: Lihatiede ja -t

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	1 Aug 2023-31 Jul 2026

Credits	20 cr
Languages	English
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	yes
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Per Ertbjerg, Responsible teacher Hanna Happonen, Administrative person
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN:

Compulsory, 15 cr:

FOOD-801 Meat Technology, lectures, 5 cr

FOOD-805 Meat Science and Technology, lab work, 5 cr **

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

Electives, 5 cr:

HNFB-111 Anatomian ja fysiologian perusteet, 5 cr (in Finnish, BSc level)

FOOD-109 Food Fermentation and Enzyme Technology, 5 cr

FOOD-601 Extrusion, 5 cr

FOOD-602 Food Structure, lab work, 3 cr

MMB-302 Food and Environmental Hygiene and Control, 5 cr

**Compulsory only if the Master's thesis is done in the study module.

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

Learning outcomes

EN: After completion of the study module the student will have a detailed knowledge on fresh meat struc- ture and quality, meat processing and unit operations, as well as meat products and their production.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion. FOOD-130 Meat and Meat Analog Science and Technology (4 cr)

Additional information

EN:

Target group

The study module is one of the four secondary modules with an option to carry out a Master's thesis.

Recommended time or stage of studies for completion

1st and 2nd year. The prerequisite course FOOD-130 Meat and Meat Analog Science and Technology is taken in period I, and FOOD-801 and FOOD-803 in period III.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-900 Product Development in the Food Sector, Study Module

FOOD-900 Tuotekehitys elintarvikealalla, opintokokonaisuus

FOOD-900 Produktutveckling inom livsmedelsbranschen, studiehelhet

Abbreviation: Tuotekehitys el

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	25 cr
Languages	Finnish, English, Swedish
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100% Responsible persons Sari Ollila, Responsible teacher Hanna Happonen, Administrative person Anna-Maija Lampi, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: 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 study module should be done with one of the responsible teachers before starting the studies. It is highly recommended that the student will include either YET-104 or FOOD-901 or equivalent knowledge in the study module.
For example, the following courses may be included in the study module of 25 cr:

YET-104 Asiakaslähtöinen tuotekehitys elintarvikealalla, 5 cr

FOOD-910 New Product development in food industry, a literature examination, 3 or 5 cr

ENT-202 Me as a change maker, 2 cr

YET-004 Elintarvikemarkkinoinnin perusteet, 5 cr

EKM-102 Digitaalinen markkinointi, 5 cr

ETK-250 Pakkausteknologian perusteet *), 5 cr

FOOD-604 Advanced Lectures in Packaging Technology, 2 cr

FOOD-118 Literature Exam, Packaging Technology, 3 cr

ETK-240 Aistinvaraisen tutkimuksen perusteet *), 5 cr

FOOD-117 Literature Exam, Sensory Science #, 5 cr

FOOD-116 Advanced Sensory Science, 5 cr

ETK-264 Terveysvaikutteiset elintarvikkeet *), 3 cr

FOOD-103 Food Additives, 5 cr

ETK-131 Elintarvikelainsäädäntö ja #valvonta *), 3 cr

FOOD-401 European Food Safety, cr 5

FOOD-101 Food Processing Technology, 3 cr

FOOD-607 Food Solutions Master Class, 10- 15 cr (?)

Other courses, e.g., exchange studies, may also be included in the study 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 Bachelor's studies in Food Sciences

only for those who cannot take ETK-240

Other information

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

Learning outcomes

EN: 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.

Additional information

EN:

Target groups

The module is optional for Food Sciences Master's students. The study module is also available for stu- dents in "Ympäristö- ja elintarviketalouden kandidaattiohjelma", and for other students with bachelor level knowledge in Food Sciencees or equivalent knowledge.

Recommended time or stage of studies for completion

1st year and 2nd year

Expiry of studies

Module completion expires in 10 years.

Language of instruction

English and Finnish

EQF level

Master's /

EQF level 7

FOOD-1000 FOOD Special Module, Study Module

FOOD-1000 FOOD-erikoismoduuli, opintokokonaisuus

FOOD-1000 FOOD-specialmodulen, studiehelhet

Abbreviation: FOOD-erikoismod

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	15-25 cr
Languages	Finnish, English, Swedish
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	yes
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Hanna Happonen, Administrative person Kirsi Mikkonen, Responsible teacher Pekka Varmanen, Responsible teacher

	Kati Katina, Responsible teacher
Study module level	Intermediate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Courses to be included in the study module are according to agreement with the student and the responsible person for the main or secondary study module in which the student is doing her/his Master's thesis and as presented in the personal study plan.

Learning outcomes

EN: To support other studies in the programme by learning more in a selected topic of natural sciences, biosciences or food sciences. The study module enables the student to have a more in-depth understand- ing 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 Master's thesis.

Additional information

EN:

Target groups

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

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-1100 Food Packaging

FOOD-1100 Elintarvikkeiden pakkaaminen
FOOD-1100 Förpacking av livsmedel

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	20 cr
Languages	English, Swedish, Finnish
Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Hanna Happonen, Administrative person Hanna Koivula, Responsible teacher
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 5 cr:
FOOD-603 Packaging Technology, lab work, 3 cr

FOOD-604 Advanced Lectures in Packaging Technology, 2 cr

Electives, 15 cr:

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

FOOD-602 Food Structure, lab work, 3 cr

FOOD-605 Potential Novel Methods and Technologies, 5 cr

FOOD-401 European Food Safety, 5 cr

Aalto Univ. Design insight, 9 cr

Aalto Univ. Art of packaging, 9 cr

FOOD-120 Working in a Research Group, 3-5 cr

**Topic from packaging technology

Other courses relevant to packaging (e.g., polymer or other material sciences, physical chemistry, production technologies) may be included in the study module personal study plan according to agreement with the responsible person.

Learning outcomes

EN: After completing the study module the student has knowledge of food packaging materials and technologies and their working principles. The student is able to identify, evaluate and discuss food packaging solutions from various viewpoints such as functionality, sustainability and food safety. She/he has gained food packaging related laboratory and reporting skills as well as team work skills.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion. ETK-250 Pakkausteknologian perusteet or equivalent basic knowledge of food packaging technology (on record) or FOOD-118 Literature Examination

Additional information

EN:

Target groups

The study module is one of the four secondary study modules with an option to carry out a Master’s thesis.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

FOOD-1200 Sensory Food Science

FOOD-1200 Ruoan aistittava laatu

FOOD-1200 Sensorisk matvetenskap

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	20 cr
Languages	English, Swedish, Finnish

Graded module	yes
Grading scale	General scale, 0-5
Content approval required	no
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Mari Sandell, Responsible teacher Hanna Happonen, Administrative person
Study module level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Content description

EN: Compulsory, 15 cr:

FOOD-116 Advanced Sensory Science, 5 cr

FOOD-117 Literature Exam, Sensory Food Science, 5 cr

FOOD-120S Working in a Research Group in the Senses and Food group, 3 cr

FOOD-121S Practical Teaching Training in the Sense and Food group, 2 cr

Electives, 5 cr:

EKM-104 Kuluttajat, markkinat ja yhteiskunta, 5 cr

PHD-302 Introduction to Open Data Science, 5 cr

FOR-111 Behavioural Change and Sustainability, 5 cr

Learning outcomes

EN: After completing the study module the student has knowledge of the sensory science methodology and multisensory perception. The student understands the senses, sensory perception and sensory food sci- ence (basic procedures, scales, panels, and data analyses) and flavor experience and its analysis. The stu- dent learns to design and conduct sensory study, to analyze the results using relevant statistical methods, to report sensory studies applying principles of scientific writing, to develop the skills in teamwork and scientific writing.

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed or close to the completion. Accepted ETK-240 or equivalent basic knowledge of sensory food science as a background. Accepted Basics of statistics (ME-004, Y130A) Tilastollisen ajattelun perusteet and ME-005 (Y130B) Tilastollisten menetelmien perusteet, or equivalent knowledge.

Additional information

EN:

Target groups

The module is one of the four secondary study modules with an option to carry out a Master’s thesis.

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

COURSES

FOOD-002 Master's thesis

FOOD-002 Master's thesis

FOOD-002 Master's thesis

Abbreviation: Master's thesis

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	30 cr
Languages	Finnish, English, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Mikkonen, Responsible teacher Kirsi Jouppila, Responsible teacher Mari Sandell, Responsible teacher Hanna Koivula, Responsible teacher Laila Seppä, Responsible teacher Pekka Varmanen, Responsible teacher Kati Katina, Responsible teacher Per Ertbjerg, Responsible teacher Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: 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 nec- essary knowledge and skills for collecting the data and processing (statistics) them, and skills for scientific writing.

Equivalences to other studies

87174 Master's thesis (EK)

or

8720030 Master's Thesis (ETT)

Learning outcomes

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

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

Content

EN: 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 liter- ature

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.

Additional information

EN:

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. The student need to enroll in Seminars for Food Sciences (FOOD-104) and pass the course accordingly.

Assessment practices and criteria

The MSc thesis will be graded on the scale according the guidelines set by the University and the Faculty. More information from Instructions for Students - Thesis Instuctions in Your Degree Programme.

Activities and methods in support of learning

Target groups

Master's thesis is compulsory for Food Sciences master's students.

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

2nd year

Study module

Compulsory in the Advanced studies in Food Sciences

Expiry of studies

10 years

Language of instruction

English.

EQF level

Master's / EQF level 7

FOOD-101 Food Processing Technology

FOOD-101 Food Processing Technology

FOOD-101 Food Processing Technology

Abbreviation: Food Processing

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kirsi Jouppila, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sci-

ences

Prerequisites

EN: Bachelor level knowledge in Food Sciences

Equivalences to other studies

8720123 Food Processing Technology ET810

or

8720124 Conventional Processing Technologies ET410

Learning outcomes

EN: 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. Literature search, scientific writing as well as group working, network- ing and debating skills are intended learning outcomes of this course.

Content

EN: The conventional food processes: e.g., preservation and separation methods with practical examples.

Additional information

EN:

Completion methods

Contact teaching 16 h, group work 30 h, self study 35 h. Participation in group work and debates. Active attendance in lectures and group meetings; meetings with the teacher and teaching seminars are compulsory.

Assessment practices and criteria

The grade is based on learning diary and 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.

Activities and methods in support of learning

Lectures given by the teachers, debates of the groups of the students.

Target groups

The course is compulsory for students of Master's programme in Food Sciences. The course is available for other students with Bachelor level knowledge in Food Sciences.

Teaching period when the course will be offered

Period I

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Advanced studies in Food Sciences.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature and study realisation will be described at the first course meeting and updated in the course Moodle area during the course.

FOOD-102 Food Structure, lectures

FOOD-102 Food Structure, lectures

FOOD-102 Food Structure, lectures

Abbreviation: Food Structure,

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Koivula, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in Food Sciences

Equivalences to other studies

8720112 Food Structure, lectures ET820

Learning outcomes

EN: 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.

Content

EN: The structure and physical properties of food systems, their modification, measurement and link to food stability.

Additional information

EN:

Completion methods

Participation to lecture series, and self study

Assessment practices and criteria

Assessment is based on exam (100%). The evaluation scale is 0-5.

Activities and methods in support of learning

Questions during lectures, discussions, review session to apply and deepen the learning

Target groups

Students in Master's programme in Food Sciences. The course is available for students from other programmes and for exchange students. Please note that prior BSc level knowledge of food physics, food physical chemistry and/or food chemistry is required as this course will build up on those.

Teaching period when the course will be offered

Period II

Recommended time or stage of studies for completion

1st year

Study module

The course is a compulsory in Advanced studies in Food Sciences.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Lecture slides, web resources and scientific papers. The materials will be distributed though course Moodle page.

FOOD-103 Food Additives

FOOD-103 Food Additives

FOOD-103 Food Additives

Abbreviation: Food Additives

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in Food Sciences

Equivalences to other studies

87148 Food additives EK365

Learning outcomes

EN: 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.

Content

EN: 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 & sta- bilizers, flavour enhancers, and sweeteners.

Additional information

EN:

Completion methods

Lecture series + written essays, contact teaching 30 h, self study 103 h

Assessment practices and criteria

Literature examination 80%, written essays 20% . The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

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

Teaching period when the course will be offered

Period II

Recommended time or stage of studies for completion

1st or 2nd year

Study module

Compulsory in the Advanced studies in Food Sciences

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Material will be provided via Moodle with links to current food additives legislation

FOOD-104 Seminars in Food Sciences

FOOD-104 Seminars in Food Sciences

FOOD-104 Seminars in Food Sciences

Abbreviation: Seminars in Foo

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Laila Seppä, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Equivalences to other studies

87172 Seminars (EK355)

or

8720114 Seminars ET885

Learning outcomes

EN: The student has good understanding of the Master's programme in Food Sciences, its structure, main and secondary study modules, other modules and elective studies, and is able to prepare a personal study plan. By attending the seminar sessions, the student learns about the research interests of other students doing their Master’s thesis and projects linked to the programme. The student can present orally her/his research topic and plans of experimental study and can summarize her/his own Master's thesis research, main results and conclusions to an audience of seminar session. The student can critically discuss the re- search work of others and receive and use feedback in her/his own research.

Content

EN: The structure, main and secondary study modules, other study modules and elective studies of the Master's programme in Food Sciences. Study guidance sessions. Presentations and posters of students doing their Master’s thesis: the first one on the background and research plan and the second one on the results of the student's own research.

Additional information

EN:

Completion methods

Preparation of a personal study plan (PSP) in Sisu. Attendance to at least 12 seminar sessions, making a learning diary, giving two oral presentations with written abstracts and a poster related to the second presentation and acting in different roles (chair, opponent).

Assessment practices and criteria

The presentations and poster will be graded using a scale 0-5. The abstracts, acting in different roles and learning diary are also taken into account when the course grade is given.

Activities and methods in support of learning

Attendance to seminars, making a learning diary, being an active part of the seminar audience, giving two seminar presentations, making a poster.

Target groups

The course is compulsory for all students of the Master's programme in Food Sciences.

Teaching period when the course will be offered

Period I-IV. The course starts once in the fall and once in the spring semester with an introductory lecture on

master studies and personal study plans (participation recommended). The course should be complet- ed over several semesters.

Recommended time or stage of studies for completion

Students should start attending the course as soon as they enter the programme. It can be started already towards the end of Bachelor studies.

Study module

Compulsory in Advanced studies in Food Sciences

Expiry of studies

10 years

Language of instruction

English/Finnish

EQF level

Master's / EQF level 7

Study materials

EN: Instructions for preparation of the presentations and poster, the different roles in seminar sessions and learning diary are provided via Moodle of FOOD-104. PSP will be instructed by the module supervising teacher.

FOOD-105 Research Exercise in Food Sciences

FOOD-105 Research Exercise in Food Sciences

FOOD-105 Research Exercise in Food Sciences

Abbreviation: Research Exerci

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	6 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kati Katina, Responsible teacher Kirsi Jouppila, Responsible teacher Pekka Varmanen, Responsible teacher Per Ertbjerg, Responsible teacher Hanna Koivula, Responsible teacher Mari Sandell, Responsible teacher Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sci- ences

Prerequisites

EN: The courses of the main or secondary study module in which the student will do her/his Master's the- sis.

Learning outcomes

EN: The student can search and evaluate scientific literature and is able to utilize the knowledge for making a literature review for the Master’s thesis project. The student becomes familiar with the methods, process- es and materials needed in her/his thesis research. After the course the student can, under light-super- vision, plan and carry out a study to solve clearly outlined, small research problem and report the study orally and in writing.

Content

EN: Literature search, writing a literature review for the Master’s thesis project.

Additional information

EN:

Completion methods

The student writes a literature review on a literature survey. More specific guidance is available from the responsible person and supervisor of the student’s Master’s thesis project.

Assessment practices and criteria

The grading will be according to specific study module (using scale 0-5).

Activities and methods in support of learning

Problem solving, reporting orally and in writing, discussions with the responsible person and supervisor of the student's Master's thesis project.

Target groups

The course is available for students of Master's programme in the Food Sciences. It is compulsory for students in Master's programme in Food Sciences.

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

2nd year, Master’s thesis project is started with this course.

Study module

The course is a compulsory in Advanced studies in Food Sciences.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature searched on a topic related with the master’s thesis research.

FOOD-106 Vitamins and Other Bioactive Substances

FOOD-106 Vitamins and Other Bioactive Substances

FOOD-106 Vitamins and Other Bioactive Substances

Abbreviation: Vitamins and Ot

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Susanna Kariluoto, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sci-

ences

Prerequisites

EN: Bachelor level knowledge in food sciences or chemistry

Equivalences to other studies

87145 Vitamins and other bioactive compounds EK364

Learning outcomes

EN: Upon completion of this course, the student can categorise terms related to vitamins, other bioactive compounds and their health effects. The student can describe the chemical properties, occurrence, and functions of bioactive compounds and illustrate their role in foods. The student is able to assess factors affecting intake and bioavailability of bioactive compounds and evaluate analytical methods for determining them. Additionally, the student is able to review critically arguments for and against supplementation.

Content

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

Additional information

EN:

Completion methods

Participation in teaching; assignments and final exam.

Assessment practices and criteria

The performance will be graded using a scale of 0–5, based on written assignments and final examination.

Activities and methods in support of learning

Group discussions and small tasks during the lectures.

Target groups

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. Suitable for exchange students.

Teaching period when the course will be offered

Period IV, even years only

Recommended time or stage of studies for completion

1st or 2nd year

Study module

The course is included as optional in the study module Food Chemistry.

Expiry of studies

The course expires in 10 years.

Language of instruction

Teaching language is English.

EQF level

Master's / EQF level 7

Study materials

EN: Lecture material and other material assigned to the course in Moodle.

Supportive reading: Damodaran S & Parkin KL, Fennema's Food Chemistry, 5th edition, CRC Press Inc., New York, 2017.

FOOD-107 Organic Chemistry in Food Sciences

Abbreviation: Organic Chemistry in Food Science

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Ndegwa Maina, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Basic knowledge on organic chemistry. Bachelor's degree completed

Compulsory prerequisites

ETK-520 Structure and reactions of biomolecules

Equivalences to other studies

850004 Applied Organic Chemistry EK322

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Participation in teaching, group work and a final take home exam

The course begins with a pre-course exam that covers chapters 1-6 of the course book (McMurry, J. 2010 or 2012: Organic Chemistry, and/or corresponding books of organic chemistry.)

Assessment practices and criteria

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

Activities and methods in support of learning

Problem-based learning, group work, exercises, independent studies

Target groups

The course is pre-requisite for Food Chemistry module. Priority is therefore given to students choosing the study module of Food Chemistry. The course is available for other master’s students with bachelor level knowledge in food sciences or in chemistry.

Teaching period when the course will be offered

Period I-II (the course is arranged in two periods)

Recommended time or stage of studies for completion

1st year of Masters studies

Study module

The course is compulsory in the Food chemistry Module

Expiry of studies

10 years

Language of instruction

Teaching language is English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-108 Organic Structure Analysis

FOOD-108 Organic Structure Analysis

FOOD-108 Organic Structure Analysis

Abbreviation: Organic Structu

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Ndegwa Maina, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Course “FOOD-107 Organic Chemistry in Food Sciences” or equivalent knowledge.

Equivalences to other studies

85035 Organic Structural Analysis EK325

Learning outcomes

EN: 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 the- ory and practical problem solving. During the laboratory work, the student will also learns organic chem- istry 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.

Content

EN: 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.

Additional information

EN:

Completion methods

Participation in lectures, laboratory work, bonus tasks, and an exam

Assessment practices and criteria

Bonus tasks, exam and laboratory work report. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Bonus tasks on interpretation of different spectroscopic data, independent studies

Target groups

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.

For the Laboratory work, the maximum number of students is 15. Priority is given to students choosing the study module of Food Chemistry.

Teaching period when the course will be offered

Period III and the beginning of Period IV for the laboratory work

Recommended time or stage of studies for completion

1st year of Masters studies

Study module

The course is compulsory in the Food chemistry module

Expiry of studies

10 years

Language of instruction

Teaching language is English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-109 Food Fermentation and Enzyme Technology

FOOD-109 Food Fermentation and Enzyme Technology
FOOD-109 Food Fermentation and Enzyme Technology

Abbreviation: Food Fermentati

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kati Katina, Responsible teacher Rossana Coda, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences.

Recommended prerequisites

864988 Food Microbiology (MIKRO233)

FOOD-201 LAB Starters and Probiotics

Equivalences to other studies

8720118 Food Fermentation Technology ET330

or

882593 Bioresource and food enzymology BIOT400

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Lecture course without compulsory attendance

Participation in teaching (lectures) and final exam. Participation in the lectures is however strongly recommended.

Assessment practices and criteria

Participation in teaching, final examination.

Activities and methods in support of learning

Lectures contain the theoretical background and activating exercises deepen the learning. Participation in the lectures is strongly recommended.

Target groups

The course is optional for Food Sciences master's students. The course is available for students of other degree programmes and exchange students with bachelor level knowledge in chemistry, biochemistry, microbiology. Priority given to students enrolling in the Food Science master's programme.

Teaching period when the course will be offered

Period III

Recommended time or stage of studies for completion

Recommended for completion starting from the 3rd year of study

Study module

The course is included as optional course in Study modules: Dairy Science and Technology, Food Technolo- gy, Grain Science and Technology, Food Safety, Meat Science and Technology

Expiry of studies

The course expires in 10 years.

Language of instruction

Teaching language is English.

EQF level

Master's / EQF level 7

Study materials

EN: Literature (compulsory and recommended) is assigned during the course.

FOOD-110 Cereal and Pulse Ingredient Functionality

FOOD-110 Cereal and Pulse Ingredient Functionality

FOOD-110 Cereal and Pulse Ingredient Functionality

Abbreviation: Cereal and Puls

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Noora Mäkelä-Salmi, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences.

Recommended prerequisites

FOOD-701 Food Crop Quality

or

812110 Field Crop Quality

Equivalences to other studies

8720143 Cereal and Pulse Ingredient Functionality ET710

Learning outcomes

EN: After the course, student knows and understands the role of essential plant-based functional ingredi- ents in food processes. Student is able to evaluate how different food macromolecules affect the ingredi- ent functionality and how the ingredient properties affect the food-use of these plant-based ingredients. During the course, student will also learn the skills of scientific reporting.

Content

EN: Cereal, legume and other plant-based ingredient quality including the functionality of their proteins, starch, fiber and lipids.

Additional information

EN:

Completion methods

Lectures, written assignments and workshop.

Assessment practices and criteria

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.

Activities and methods in support of learning

Lectures introduce the theoretical background and written assignments and workshop event deepen the learning.

Target groups

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.

Teaching period when the course will be offered

Period II; reports will be done during periods II and III.

Recommended time or stage of studies for completion

1st year

Study module

Optional in the Advanced studies in Food Sciences

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: 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 & Hoseney. 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.

FOOD-111 Dairy Science and Technology 1

FOOD-111 Dairy Science and Technology 1

FOOD-111 Dairy Science and Technology 1

Abbreviation: Dairy Science a

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Pekka Varmanen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in biological / food sciences is helpful

Equivalences to other studies

8720301 Dairy Science and Technology 1(ETT331)

or

8720135 Dairy Science and Technology 1 ET331

Learning outcomes

EN: 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.

Content

EN: 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.

Additional information

EN:

Completion methods

Contact teaching 26 h, self study 26 h.

Assessment practices and criteria

Exam, grades 0-5.

Activities and methods in support of learning

Target groups

The course is compulsory prerequisite in the Dairy Science and Technology study module. The course is available for any students interested

Teaching period when the course will be offered

period I-II

Recommended time or stage of studies for completion

1st year

Study module

Optional in the Advanced studies in Food Sciences

Expiry of studies

10 years

Language of instruction

English.

EQF level

Master's / EQF level 7

Study materials

EN: Handouts on each of 13 lectures are available on the Moodle.

FOOD-112 Dairy Science and Technology 2

FOOD-112 Dairy Science and Technology 2

FOOD-112 Dairy Science and Technology 2

Abbreviation: Dairy Science a

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Asmo Kemppinen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: The preceding course Dairy Science and Technology 1 is helpful to perform before this course. Bachelor level knowledge in biological / food Sciences is helpful.

Recommended prerequisites

FOOD-111 Dairy Science and Technology 1

Equivalences to other studies

8720302 Dairy Science and Technology 2 (ETT332)
or

8720136 Dairy Science and Technology 2 ET332

Learning outcomes

EN: 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 pow- ders.

Content

EN: 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.

Additional information

EN:

Completion methods

Contact teaching 26 h, self study 26 h.

Assessment practices and criteria

Exam, grades 0-5.

Activities and methods in support of learning

Target groups

The course is available for any students interested.

Teaching period when the course will be offered

period III-IV

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Dairy Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English.

EQF level

Master's / EQF level 7

Study materials

EN: Handouts on each lecture of 13 lectures are available on the Moodle.

FOOD-115 Practical Training in Food Sciences

FOOD-115 Practical Training in Food Sciences
FOOD-115 Practical Training in Food Sciences

Abbreviation: Practical Train

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-4 cr
Languages	English, Finnish, Swedish

Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Per Ertbjerg, Responsible teacher Hanna Koivula, Responsible teacher Veli-Matti Ollilainen, Responsible teacher Pekka Varmanen, Responsible teacher Noora Mäkelä-Salmi, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences

Equivalences to other studies

87176 Research Training (EK340)

or

8720115 Practical Training 2 ET890

Learning outcomes

EN: 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.

Content

EN: Practical training and written report

Additional information

EN:

Completion methods

Practical training of one month equals one credit. One credit will be awarded for a written report. The training period is validated by submitting a letter of reference/proof of employment as part of the written report. It is recommended to use summer jobs in own field as the practical training.

Assessment practices and criteria

The written report will be graded using a scale of 0-5.

Activities and methods in support of learning

Reflection of studies and own learning

Target groups

The course is available for students of Master's programme in the Food Sciences.

Teaching period when the course will be offered

Period I-IV

Recommended time or stage of studies for completion

1st or 2nd

Study module

Optional in the Advanced studies in Food Sciences, Food Technology and Grain Science and Technology modules.

Expiry of studies

10 years

Language of instruction

Finnish, English and Swedish

EQF level

Master's / EQF level 7

Study materials

EN: More instructions can be found from FOOD master's programme info- Moodle pages or by contacting the module responsible teacher

FOOD-116 Advanced Sensory Science

FOOD-116 Advanced Sensory Science

FOOD-116 Advanced Sensory Science

Abbreviation: Advanced Sensor

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Mari Sandell, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: 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).

Compulsory prerequisites

ETK-240 Basics of Sensory Science

ME-004 Statistics I: Basics of statistics thinking

ME-005 Statistics II: Basics in statistical methods

or

FOOD-117 Literature Exam, Sensory Science

ME-005 Statistics II: Basics in statistical methods

ME-004 Statistics I: Basics of statistics thinking

or

80144 Statistics I: Basics of statistical thinking (Y130A)

80145 Statistics II: Basics of statistical methods (Y130B)

840014 Principles of sensory research (ETK240)

or

ME-004sv Statistics I: Basics of statistics thinking

ME-005 Statistics II: Basics in statistical methods

ETK-240 Basics of Sensory Science

Equivalences to other studies

840015 Advanced course in sensory research (ET245)

Learning outcomes

EN: After the course the student can design and conduct a sensory study, analyze the results using rele- vant statistical methods and report the study applying principles of scientific writing. The student can con- duct 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.

Content

EN: 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 appropri- ate methods, scales and panelists) for given food samples.

Additional information

EN:

Completion methods

Lectures, two laboratory exercises with a joint written report, and a teamwork (sensory study of a given project) and a teamtask with a written report and oral presentation..

Assessment practices and criteria

Using a scale of 0–5. Weights: Written report of exercises 40%, written report of teamwork and oral presen- tation 50%, written report and oral presentation of teamtask (10 %).

Activities and methods in support of 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.

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum num- ber of students is 32. Priority will be given to students who will do her/his Master's thesis in Sensory Food Science study module.

Teaching period when the course will be offered

Period III and IV

Recommended time or stage of studies for completion

1st year (recommended).

Study module

Compulsory in the Sensory Food Science study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Lawless, H. & Heymann, H. Sensory evaluation of food. Principles and practices. Springer, 2010. Addi- tional literature will be shared on the Moodle site of the course.

Credit transfer instructions

EN: should be negoated with a teacher

FOOD-117 Literature Exam, Sensory Science

FOOD-117 Literature Exam, Sensory Science

FOOD-117 Literature Exam, Sensory Science

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Mari Sandell, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: 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).

Content

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

Additional information

EN:

Completion methods

Literature examination in a general exam day (2 hours).

Assessment practices and criteria

Written exam, graded using a scale of 0–5.

Activities and methods in support of learning

Written exam

Target groups

This course is compulsory for those students on module Sensory Food Science. It is also alternative for other students who wish to enroll the course Advanced Sensory Science, but do not have previous studies (basic knowledge) of sensory food science.

Teaching period when the course will be offered

Period II

Recommended time or stage of studies for completion

1st year (prior to Advanced Sensory Science)

Study module

Compulsory in the Sensory Food Science study module

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature for the exam will be the selected chapters of the book Sensory Evaluation of Food (by Law- less and Heymann, 2010)

Credit transfer instructions

EN: should be negotiated with the teacher

FOOD-118 Literature Exam, Packaging Technology

FOOD-118 Literature Exam, Packaging Technology

FOOD-118 Literature Exam, Packaging Technology

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Koivula, Responsible teacher
Study level	Intermediate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Equivalences to other studies

FOOD-119 Literature Exam, Packaging Technology

Learning outcomes

EN: 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.

Content

EN: Fundamentals of the food packaging

Additional information

EN:

Completion methods

Literature exam in examinarium (2 hours).

Assessment practices and criteria

Written exam, graded using a scale of 0–5.

Activities and methods in support of learning

self study

Target groups

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.

Teaching period when the course will be offered

Period I

Recommended time or stage of studies for completion

1st year (prior to FOOD-604 Advanced Lectures in Packaging Technology and FOOD-603 Packaging Technology, lab work)

Study module

Optinal in the Product Development in the Food Sector

Expiry of studies

This course expires in 10 years.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: 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.

FOOD-120 Working in a Research Group

FOOD-120 Working in a Research Group

FOOD-120 Working in a Research Group

Abbreviation: Working in a Re

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-5 cr
Languages	English, Finnish, Swedish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Jouppila, Responsible teacher Pekka Varmanen, Responsible teacher Hanna Koivula, Responsible teacher Per Ertbjerg, Responsible teacher Kati Katina, Responsible teacher Marina Heinonen, Responsible teacher
Study level	Other studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: The prerequisite courses for the selected study module

Equivalences to other studies

87129 Project Work in Food Chemistry (EK136)

or

8720128 Exercise in reseach ET475

Learning outcomes

EN: 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 re- sults and evaluate his/her performance.

Content

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

Additional information

EN:

Completion methods

Working in a research group and a written report including self-evaluation of performance. Full-time work- ing for 5 weeks is equivalent to 5 credits.

Assessment practices and criteria

Performance during the work and written report using a scale pass-fail.

Activities and methods in support of learning

Working in a research group focusing on a selected research topic and methods

Target groups

The course is available for students of Master's programme in the Food Sciences. The course is optional for students choosing the Food Chemistry, Food Technology, Dairy Science and Technology, or Grain Science and Technology study module. 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.

Teaching period when the course will be offered

Period I-IV, also during summer

Recommended time or stage of studies for completion

1st or 2nd year

Study module

The course is optional in Food Chemistry, Food Technology, Dairy Science and Technology and Grain Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

Study materials

EN: As recommended by the research group to learn theory of the research questions and methods.

FOOD-120S Working in a Research Group in the Senses and Food group

FOOD-120S Työharjoittelu Aistit ja ruoka ryhmässä

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Swedish, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Mari Sandell, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: No prerequisites.

Learning outcomes

EN: 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.

Content

EN: Working in a research group (Senses and Food) focusing on a selected research topic and methods.

Additional information

EN:

Completion methods

Working in a research group and a written report including self-evaluation of performance. Full-time work- ing for 5 weeks is equivalent to 5 credits.

Participation in sensory studies as a study participant. 1 sensory session = 1 point, 8 points = 1 credit.

Learning diary as a report.

Assessment practices and criteria

Performance during the work and written report using a scale pass-fail.

Activities and methods in support of learning

Personal supervision in laboratory work. Self-evaluation as part of the report.

Target groups

The course is available for students of Master's programme in the Food Sciences. The course is compulsory for Sensory Food Science module students. Course is optional for other Food Sciences Master's students.

Teaching period when the course will be offered

The period is open. The timing is agreed with the person in charge of the course.

Recommended time or stage of studies for completion

1st and 2nd year of Master's studies

Study module

The course is included as compulsory in Sensory Food Science study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: As recommended by the research group to learn theory of the research questions and methods.

FOOD-121 Practical teaching training

FOOD-121 Practical teaching training

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Abbreviation: FOOD-121

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-10 cr
Languages	English, Finnish, Swedish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Jouppila, Responsible teacher Pekka Varmanen, Responsible teacher Marina Heinonen, Responsible teacher Kati Katina, Responsible teacher Per Ertbjerg, Responsible teacher Hanna Koivula, Responsible teacher Anna-Maija Lampi, Responsible teacher
Study level	Other studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: BSc degree and other background studies suitable to carry out the particular teaching. Recommended optional studies: Pedagogical studies

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Planning of teaching, teaching activities and evaluation of learning outcomes. Learning diary.

Assessment practices and criteria

Pass/fail based on the learning diary.

Activities and methods in support of learning

Supervision, guidelines and practical help for teaching.

Target groups

The course is available for students of Master's programme in the Food Sciences. This course is optional for those students who wish to obtain practical training in teaching in Food Sciences.

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

1st and 2nd year

Expiry of studies

10 years

Language of instruction

English when teaching in Master's study level; Finnish when teaching in Bachelor's study level.

EQF level

Master's / EQF level 7

Study materials

EN: 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.

FOOD-121S Practical Teaching Training in the Sense and Food group

FOOD-121S Käytännön opetusharjoittelu Aistit ja ruoka ryhmässä

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Mari Sandell, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

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

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Planning of teaching, teaching activities and evaluation of learning outcomes.

Learning diary as a report.

Assessment practices and criteria

Pass/fail based on the learning diary.

Activities and methods in support of learning

Supervision, guidelines and practical help for teaching.

Target groups

The course is available for students of Master's programme in the Food Sciences. The course is compulsory

for Sensory Food Science study module students. Course is optional for other Food Sciences Master's students.

Teaching period when the course will be offered

The period is open. The timing is agreed with the person in charge of the course.

Recommended time or stage of studies for completion

1st and 2nd year of Master's studies

Study module

The course is included as compulsory in Sensory Food Science study module.

Expiry of studies

10 years

Language of instruction

English, Finnish

EQF level

Master's / EQF level 7

Study materials

EN: 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./ Murtonen M, Opettajana yliopistolla, 2017

FOOD-130 Meat and Meat Analog Science & Technology

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	4 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Per Ertbjerg, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: The course is available for students with bachelor level knowledge in meat science and technology.

Learning outcomes

EN: A deep understanding of muscle structure, and the biochemical and chemical changes occurring in muscle and meat. A thorough understanding of meat analog production and structure.

Content

EN: Lectures, videos and seminars covering muscle structure, muscle fibers, connective tissue, energy metabolism, muscle contraction and its influence on meat quality, tenderization during ageing of meat, wa- terholding and color. Meat analogs will be introduced as well as nutritional value of meat and toxic as- pects in meat.

Additional information

EN:

Completion methods

Participation in teaching (lectures, seminars / final exam)

Assessment practices and criteria

Attendance to lectures and seminars, literature examination.

Activities and methods in support of learning

Video material.

Target groups

The course is one of the optional courses in the Advanced studies in Food Sciences and is also a prerequi- site for the Meat Science & Technology study module. The course is available for other students with bach- elor level knowledge in meat science and technology.

Teaching period when the course will be offered

Period 1

Recommended time or stage of studies for completion

Recommended for completion in the 1st year of master's study

Study module

Course is optional in the Advanced studies in Food Sciences. The course is a prerequisite for the Meat Science and Technology study module.

Expiry of studies

The course completion expires in 10 years.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Lecture material and other material assigned to the course in Moodle.

FOOD-201 LAB Starters and Probiotics

FOOD-201 LAB Starters and Probiotics

FOOD-201 LAB Starters and Probiotics

Abbreviation: LAB Starters &

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Pekka Varmanen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: At least one microbiology laboratory course has been performed

Equivalences to other studies

8720138 LAB Starters ET340

Learning outcomes

EN: 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.

Additional information

EN:

Completion methods

Assessment practices and criteria

Course exam (50%), laboratory report & participation activity (50%). Grading 0-5

Activities and methods in support of learning

Lectures, practical laboratory works, group work, self study, peer-review.

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 12. Priority will be given to students who will do her/his Master’s thesis in the Dairy Science and Technology study module. The course is available for students of other programmes with basic knowl- edge of microbiology if there are free places.

Teaching period when the course will be offered

Period II

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in Dairy Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Course manual. Indicated book chapters and other teaching material distributed during the course

FOOD-202 Liquid Milk Products

FOOD-202 Liquid Milk Products

FOOD-202 Liquid Milk Products

Abbreviation: Liquid Milk Pro

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Asmo Kemppinen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Dairy Science and Technology 1 (2 cr) should be performed latest during the same semester with this course.

Recommended prerequisites

FOOD-111 Dairy Science and Technology 1

Equivalences to other studies

8720139 Liquid milk products ET621

Learning outcomes

EN: 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.

Content

EN: Microbiology of raw and pasteurized milks: spoilage bacteria (pseudomonads and bacilli). Robotic milk- ing 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 Viili) in a small scale. Excursions to University dairy farm and two local dairies manufacturing liquid milk products. Seminars on indicated sub- jects. Lectures by visiting specialists. Theory on indicated literature.

Additional information

EN:

Completion methods

Contact teaching 20 h, laboratory work 20 h, group work 50 h and self study 65 h.

Assessment practices and criteria

Activity (25%), seminars and reports (15-25%), exam (50-60%). Grades 0-5.

Activities and methods in support of learning

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 10. Priority will be given to students who will do her/his Master’s thesis in the Dairy Science and Technology study module. The course is available for students of other programmes with basic knowl- edge in Food Sciences if there are free places.

Teaching period when the course will be offered

Period I-II

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Dairy Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-203 Solid Milk Products

FOOD-203 Solid Milk Products

FOOD-203 Solid Milk Products

Abbreviation: Solid Milk Prod

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English

Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Pekka Varmanen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: FOOD-111 Dairy Science and Technology 1 (2 cr) and FOOD-202 Liquid Milk Products (5 cr)

Compulsory prerequisites

FOOD-111 Dairy Science and Technology 1

FOOD-202 Liquid Milk Products

Equivalences to other studies

8720140 Kiinteät maitovalmisteet ET622

Learning outcomes

EN: The general goal is to provide students with knowledge of the technology involved in processing of sol- id 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 chem- ical properties, reactivity and analysis of milk components, the principles of cheese making, the ripening process and the microbial defects.

Content

EN: 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.

Additional information

EN:

Completion methods

Contact teaching, laboratory work, group work and self study.

Assessment practices and criteria

Activity (25%), seminars and reports (15-25%), exam (50-60%). Grades 0-5.

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 10. Priority will be given to students who will do her/his Master’s thesis in the Dairy Science and Technology study module. The course is available for students of other programmes with basic knowl- edge in Food Sciences if there are free places.

Teaching period when the course will be offered

Periods III-IV

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Dairy Science and Technology module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-204 Literature Exam, Dairy Science and Technology

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

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Pekka Varmanen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

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

Recommended prerequisites

FOOD-111 Dairy Science and Technology 1

FOOD-112 Dairy Science and Technology 2

Equivalences to other studies

8720142 Literature Exam ET690

Learning outcomes

EN: Profound understanding of Dairy Science and Technology

Additional information

EN:

Completion methods

Examination

Assessment practices and criteria

Grading using a scale 0-5.

Activities and methods in support of learning

Oral feedback after examination.

Target groups

The course is compulsory in the Dairy Science and Technology study module

Teaching period when the course will be offered

The exam is organized once a month during periods I-IV.

Recommended time or stage of studies for completion

During the 2nd year of master's studies.

Study module

The course is compulsory in the Dairy Science and Technology study module

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-301 Research in Food Chemistry

FOOD-301 Research in Food Chemistry

FOOD-301 Research in Food Chemistry

Abbreviation: Research in Foo

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences

Equivalences to other studies

871062 Food chemistry research (EK321)

Learning outcomes

EN: The student knows basics in scientific research (such as planning, funding, oral and written presenta- tion, and ethical aspects) and gets acquainted wíth recent research topics and methods in Food Chemistry. The student knows master's thesis related practices.

Content

EN: Current research topics in food chemistry, planning of research project, research ethics, oral and writ- ten presentation, requirements and practices in master’s thesis projects and in writing of theses.

Additional information

EN:

Completion methods

Participation in contact teaching, self-study including writing a research plan, an abstract and giving two oral presentations based on a given scientific paper, learning diary. Active attendance at teaching sessions is required.

Assessment practices and criteria

The performance will be graded using a scale 0-5. The grade is based on written research plan and ab- stract, oral presentations, and learning diary.

Activities and teaching methods in support of learning

Students own activities, reading, writing and oral presenting, are the focus of the course.

Target groups

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. Priority is given to students who carry out their Master's thesis in Food Chemistry. Maximum number of students is 15.

Teaching periods when the course will be offered Periods

III-IV (starting in period III, mainly in period IV). Recommended

time or stage of studies for completion

1st year of master's studies

Study module

The course is included as compulsory in the Study module Food Chemistry.

Expiry of studies

The course normally expires in 10 years.

Language of instruction

English or Finnish

EQF level

Master's / EQF level 7

Study materials

EN: Available in Moodle

FOOD-302 Research Methods in Food Chemistry

FOOD-302 Research Methods in Food Chemistry

FOOD-302 Research Methods in Food Chemistry

Abbreviation: Research Method

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	8 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Susanna Kariluoto, Responsible teacher Veli-Matti Ollilainen, Responsible teacher Anna-Maija Lampi, Responsible teacher Mari Lehtonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Elintarvikekemiallinen analytiikka, laboratoriotyöt (ETK-225), Organic Chemistry in Food Sciences (FOOD-107) and Chromatography and Other Separation Techniques in Food Analysis (FOOD-305), Separation Techniques (KEM331), or equivalent knowledge.

Compulsory prerequisites

ETK-225 Food analysis, laboratory course

FOOD-107 Organic Chemistry in Food Sciences

FOOD-305 Chromatographic and Other Separation Techniques in Food Analysis

or

ETK-225 Food analysis, laboratory course

FOOD-107 Organic Chemistry in Food Sciences

KEM331 Separation techniques

Equivalences to other studies

87163 Research methods (EK331)

Learning outcomes

EN: 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 writing scientific papers, reports and MSc thesis, and giving small presentations of own results. After the course the student can apply these issues in her/his own scientific research.

Content

EN: The course includes four extensive laboratory tasks including meetings before and after the laboratory work. Each task is done is 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 as- pects of data and method development, and evaluation of experimental data. The theoretical background of each task is presented.

Additional information

EN:

Completion methods

Laboratory work, meetings and reports.

Assessment practices and criteria

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.

Activities and methods in support of learning

Students participate in teaching of the background of the tasks, and in evaluating the experimental re- sults. They will get feedback from the first version of their reports.

Target groups

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.

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 15. Priority will be given to students who choose Food Chemistry, Food Safety, or Sensory Food Science study module with a Master’s thesis included.

Teaching period when the course will be offered

Periods I-II

Recommended time or stage of studies for completion

2nd year

Study module

The course is included as compulsory in the Study module Food Chemistry

Expiry of studies

The course expires in 10 years.

Language of instruction

Teaching language is English.

EQF level

Master's / EQF level 7

Study materials

EN: All course materials are available in Moodle

FOOD-303 Literature Exam 1, Food Chemistry

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

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	1 Aug 2023-31 Aug 2026
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: No prerequisites

Equivalences to other studies

87131 Exam in food chemistry (EK310)

Learning outcomes

EN: 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.

Content

EN: The focus lies on water, carbohydrates, proteins, and lipids as food components: structures, reactions, interactions, function in foods. The exam also covers major enzymes in food systems.

Additional information

EN:

Completion methods

An exam.

Assessment practices and criteria

The performance in the course will be graded using a scale 0-5.

Activities and methods in support of 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 exam the student will get oral feedback.

Target groups

The course is compulsory in the Food Chemistry study module. The course is open to other students of the Master's Programme in Food Sciences. The course is prerequisite for starting a master's thesis in Food Chemistry.

Teaching period when the course will be offered

The exam is organized once a month in periods I-IV.

Recommended time or stage of studies for completion

Recommended for completion in the 1st year periods III-IV or the 2nd year periods I-II.

Study module

The course is included as compulsory in the Study module Food Chemistry and as optional for other students of the Master's Programme in Food Sciences.

Expiry of studies

The course expires in 10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature: Damodaran S & Parkin KL, *Fennema's Food Chemistry,* 5th edition, CRC Press Inc., New York, 2017, chapters 1-6.

FOOD-304 Literature Exam 2, Food Chemistry

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

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki

Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Jouppila, Recruitment process ongoing
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: No prerequisites

Equivalences to other studies

87175 Advanced literature (EK360)

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

An exam

Assessment practices and criteria

The performance in the course will be graded using a scale 0-5.

Activities and methods in support of learning

After written examination the student will get oral feedback.

Target groups

The course is open in the Food Chemistry study module and for other students of the Master's Programme in Food Sciences.

Teaching period when the course will be offered

The exam is organized once a month during periods I-IV.

Recommended time or stage of studies for completion

Recommended timing during the 2nd year of master's studies.

Study module

The course is optional in the Study module Food Chemistry and for other students of the Master's Programme in Food Sciences.

Expiry of studies

The course expires in 10 years.

Language of instruction

English.

EQF level

Master's / EQF level 7

Study materials

EN: Damodaran S & Parkin KL, *Fennema's Food Chemistry,* 5th edition, CRC Press Inc., New York, 2017, chapters 8-16 or a book selected from a list of recommended books in Moodle. Other books may be suggested by the student.

FOOD-305 Chromatographic and Other Separation Techniques in Food Analysis

FOOD-305 Kromatografia ja muut erotusmenetelmät elintarvikeanalytiikassa

FOOD-305 Kromatografi och andra separationsmetoder i livsmedelsanalytik

Abbreviation: Kromatografia j

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Mari Lehtonen, Responsible teacher
Study level	Advanced studies

Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: The course will walk through the principles of various chromatographic and other separation tech- niques providing knowledge for their use in food analysis.

Prerequisites

EN: No prerequisites. The course is available for students with bachelor level knowledge on food sciences and basic knowledge on organic chemistry.

Equivalences (free text field)

EN:

Relations to other study units

Alternative to KEM331 Separation Techniques as part of the Food Chemistry Module.

Learning outcomes

EN: After completing the course, the student knows:

- Principles of chromatography theory
- Principles of gas chromatographic, liquid chromatographic and
- Other separation techniques
- Sample pretreatment for chromatographic analysis
- Different parameters affecting the separations
- election 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
- How to apply systemic thinking and problem solving skills in planning chromatographic analysis for food applications

Content

EN: 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.

Additional information

EN:

Completion methods

The course can be completed entirely by distance learning. The course is organized remotely as flipped classroom including independent studies, exercises and group work each week. Active participation in contact teaching (remotely), group work (remotely) and independent studying are required. Acceptance of group work and assignments.

Assessment practices and criteria

Weekly participation in independent studies & exercises and in group work sessions are required. Course evaluation is based on group work and final assignment. Group work topics are based on weekly themes. Final assignment is a case study which is solved with the tools and skills learned during the course. The performance will be graded using a scale of 0-5. Evaluation criteria are available in Moodle.

Activities and methods in support of learning

The course is organized as flipped classroom which includes weekly independent studies, exercises and group work. Each week the students will first familiarize themselves to the course topics and theories in their independent studies (5-6 hours) after which these topics and theories will be discussed and applied
in group work exercises (3-4 hours). At the end of the course, each student will receive a case study where they can utilize their systemic thinking and problem solving skills.

Target groups

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

Teaching period when the course will be offered

Annually one course in periods I-II.

Recommended time or stage of studies for completion

The first year in the Master's Programme in Food Sciences.

Study module

The course is included as compulsory in Study module FOOD-300 Food Chemistry.

Expiry of studies

According to the general guidelines and timelines at University of Helsinki, the course expires in 10 years.

Language of instruction

The course will be given in English.

EQF level

Master's / EQF level 7

Study materials

EN: Course materials include among others videos, reading material and exercises, which are distributed during the course using Moodle.

FOOD-401 European Food Safety

FOOD-401 European Food Safety

FOOD-401 European Food Safety

Abbreviation: European Food S

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Equivalences to other studies

871003 European Food Legislation and Control EK366

Learning outcomes

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

Content

EN: 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.

Additional information

EN:

Completion methods

Contact teaching 26 h, assignments 53 h, self study 54 h.

Assessment practices and criteria

Literature examination 80%, assignments 20%. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

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

Teaching period when the course will be offered

period III, even years only

Recommended time or stage of studies for completion

1st or 2nd year

Study module

Compulsory in the Food Safety study module

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Material will be provided via Moodle. Further material: http://ec.europa.eu/food/safety_en

FOOD-402 Chemical Risk Factors

FOOD-402 Chemical Risk Factors

FOOD-402 Chemical Risk Factors

Abbreviation: Chemical Risk F

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Veli-Matti Ollilainen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Good knowledge in basic chemistry is recommended.

Equivalences to other studies

871072 Chemical Risk Factors EK362

Learning outcomes

EN: After completing the course the student understands the main chemical risk factors related to food and environmental. Students have the basic knowledge about the currents trends of chemical hazards and

are able to estimate the relevance of the chemical hazards to the food production chain.

Content

EN: The content includes the chemical hazards, their structures, reactivity, analytical methods, and the occurrence in foods or feeds. After the course student understand the chemical safety issues and can evalu- ate the role of persistent organic pollutants POPs, harmful heavy metals, effect of food processing, natur- al harmful components, food irradiation and radioactive residues in different food chains. The course de- scribes also briefly the basics of the European rapid alert system for food and feed (RASFF).

Additional information

EN:

Completion methods

Contact teaching, self study, laboratory visit (if possible). Course includes a visit to Finnish Food Safety Authority Ruokavirasto (if possible)

Assessment practices and criteria

Examination, graded using a scale of 0-5.

Activities and methods in support of learning

Lectures, reading the supporting materials in Moodle, lectures will be recorded (videos)

Target groups

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

Suitable for exchange students as well.

Teaching period when the course will be offered

period II

Recommended time or stage of studies for completion

Masters' studies

Study module

The course is compulsory in the Food Safety study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Lectures and additional materials in Moodle.

Credit transfer instructions

EN: Study attainments elsewhere can be used for substitution.

FOOD-403 Food Toxicology and Risk Assessment

FOOD-403 Food Toxicology and Risk Assessment
FOOD-403 Food Toxicology and Risk Assessment

Abbreviation: Food Toxicology

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr

Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences

Equivalences to other studies

871073 Food Toxicology and Risk Assessment EK363

Learning outcomes

EN: 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.

Content

EN: 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.

Additional information

EN:

Completion methods

Lecture series + written essay, contact teaching 30 h, self study 103 h.

Assessment practices and criteria

Literature examination 80 %, written essay 20 %. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

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

Teaching period when the course will be offered

period IV, odd years only

Recommended time or stage of studies for completion

1st or 2nd year,

Study module

The course is compulsory in the Food Safety study module.

Expiry of studies

Studies expire in ten years.

Language of instruction

Teaching language is English.

EQF level

Master's / EQF level 7

Study materials

EN: Material provided during the course with links to relevant web-pages (e.g. EFSA, EU commission). Sup-

portive reading: Püssa, T. 2014. Principles of Food Toxicology. 2nd ed. CRC Press. Chapters 1-6.

FOOD-404 Literature Exam, Food Safety

FOOD-404 Literature Exam, Food Safety

FOOD-404 Literature Exam, Food Safety

Abbreviation: Literature Exam

Curriculum period	2023-24
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Marina Heinonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in Food Sciences

Equivalences to other studies

871076 Literature Examination (EK361)

Learning outcomes

EN: After completing the examination the student will have a wide understanding of food

toxicology. Content

EN: Principles of food toxicology.

Additional information

EN:

Completion methods

Self study 133 h.

Assessment practices and criteria

The grade is based on examination. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

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.

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

2nd year

Study module

The course is compulsory in the Food Safety study module.

Expiry of studies

10 years.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Püssa, T. 2014. Principles of Food Toxicology. 2nd ed. CRC Press.

FOOD-601 Extrusion

FOOD-601 Extrusion

FOOD-601 Extrusion

Abbreviation: Extrusion

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kirsi Jouppila, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Food Processing Technology or equivalent knowledge.

Equivalences to other studies

8720124 Conventional Processing Technologies ET410

Learning outcomes

EN: 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.

Content

EN: Extruders with working principles and applications. Effects of extrusion parameters on the properties of extrudates. Response surface methodology in studying the effects of extrusion parameters.

Additional information

EN:

Completion methods

Participation in group work including meetings with the teacher and laboratory work (approximately 2.5 days in laboratories). Attendance at 90% of teaching seminars is compulsory.

Assessment practices and criteria

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.

Activities and methods in support of learning

Group work, teaching given by the students, practical laboratory work, statistical analyses.

Target groups

The course is mainly available for those students of Master's programme in the Food Sciences. Maximum number of students is 16. Priority will be given to students who will do her/his Master's thesis in Food Technology, Grain Science and Technology or Meat Science and Technology study module. The course is available for other students with bachelor level knowledge in Food Technology if there are free places.

Teaching period when the course will be offered

Period I

Recommended time or stage of studies for completion

1st year

Study module

The course can be included as an elective course in Food Technology, Grain Science and Technology and Meat Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature and study realisation will be described at the first course meeting.

FOOD-602 Food Structure, lab work

FOOD-602 Food Structure, lab work

FOOD-602 Food Structure, lab work

Abbreviation: Food Structure,

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Koivula, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences. As prerequisite, the student must enroll in FOOD-102 Food Structure, lectures at the same time as, or have completed the FOOD-102 lectures the previous year prior to registering to Food Structure Laboratory Works. Priority is 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.

Equivalences to other studies

8720113 Food structure, laboratory work ET825

Learning outcomes

EN: After the course, the student can plan and conduct measurements of food structure and rheology, eval-

uate and discuss the results and report them according to scientific convention.

Content

EN: Measuring systems and principles, methods in analysis of food structure and rheological characteris- tics, analysis of measurement data and reporting scientific data.

Additional information

EN:

Completion methods

Attendance to the practical laboratory works and completion of written reports.

Assessment practices and criteria

Assessment is based on the written reports (100%). The evaluation uses a scale of 0-5. Please note: the deadline for the reports is in mid January, period III.

Activities and methods in support of learning

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum num- ber of students is 30. The course is obligatory or optional for Food Sciences Master's students depending on the study modules. Priority will be given to students who have this course as obligatory in their study plan, then to those with the course as optional. The course is available for other students with bachelor level knowledge in Food Sciences if free places remain.

The student must enroll in the Food Structure lectures at the same time with the Lab work, or have com- pleted the lectures the previous year prior to registering to the Food Structure, Lab Work. The already com- pleted FOOD-102 will be considered in priorisation.

Teaching period when the course will be offered

Period II

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in Food Technology and Grain Science and Technology study modules. The course can be included as an elective course in Dairy Science and Technology, Meat Science and Technolo- gy and Food Packaging study modules.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Background information and instructions will be available at Moodle page.

FOOD-603 Packaging Technology, lab work

FOOD-603 Packaging Technology, lab work

FOOD-603 Packaging Technology, lab work

Abbreviation: Packaging Techn

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5

University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Koivula, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: 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.

Compulsory prerequisites

ETK-250 Principles of Packaging Technology

or

FOOD-118 Literature Exam, Packaging Technology

or

840016 Principles of packaging technology (ETK250)

or

FOOD-119 Literature Exam, Packaging Technology

or

8720008 Packaging Technology 1 (ETT210)

Recommended prerequisites

FOOD-604 Advanced Lectures in Packaging Technology

Equivalences to other studies

8720127 Laboratory work in packaging technology ET455

Learning outcomes

EN: After the course, the student can analyze properties of packaging materials and interactions between food and packaging by laboratory experiments. The student can report the results according to the scientif- ic practice and evaluate their significance from the food packaging perspective.

Content

EN: Laboratory exercises: measuring the mechanical and barrier properties of packaging materials, heat-sealing, modified atmosphere packaging and shelf life.

Additional information

EN:

Completion methods

Laboratory exercises with written reports.

Assessment practices and criteria

Attendance at the laboratory work and reports 100 %. The evaluation scale is 0-5.

Activities and methods in support of learning

Laboratory work, data acquisition, reporting and discussing the results according to the principles of scien- tific writing.

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 18. Priority will be given to students with FOOD-1100 module, Food Technology or Product De-

velopment in the Food Sector (Tuotekehitys elintarvikealalla) study module or those with already complet- ed FOOD-604 course.

Teaching period when the course will be offered

Periods I and II

Recommended time or stage of studies for completion

1st year (recommended).

Study module

Compulsory in the Food Packaging module and optional in the Product Development in the Food Sector module.

Expiry of studies

The course expires in 10 years.

Language of instruction

The teaching language is English

EQF level

Master's / EQF level 7

Study materials

EN: Literature assigned at the laboratory work and on FOOD-604 and independently searched literature.

FOOD-604 Advanced Lectures in Packaging Technology

FOOD-604 Advanced Lectures in Packaging Technology

FOOD-604 Advanced Lectures in Packaging Technology

Abbreviation: Advanced Lectur

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Hanna Koivula, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: ETK-250 Pakkausteknologian perusteet or equivalent basic knowledge of food packaging technology (on record) or FOOD-118 (earlier FOOD-119) Literature Examination, Packaging Technology (available directly at the beginning of the term, for international and Finnish M.Sc. program students. The ETK-250 is highly recommended for all Finnish speaking students.

Compulsory prerequisites

ETK-250 Principles of Packaging Technology

or

FOOD-118 Literature Exam, Packaging Technology

Equivalences to other studies

8720126 Advanced lectures in packaging technology ET450

Learning outcomes

EN: The student connects relevant scientific theories with practical applications in food packaging technol- ogy. After the course, the student can differentiate the key interactions between food, packaging, and envi- ronment, and is able to interpret the significance of material properties and to evaluate the functionality of packaging.

Content

EN: Barrier properties of packaging materials, considerations for novel packaging technologies, sustainable packaging materials and food packaging sustainability and its evaluation.

Additional information

EN:

Completion methods

Lectures, submission of all required assignments and final exam.

Assessment practices and criteria

Assignments (40 %), final examination (60 %).

Activities and methods in support of learning

The course partially utilizes the flipped learning method. Interaction during lectures is encouraged. Lec- tures introduce the theoretical background and group and individual activities are planned to be used to reflect and deepen the learning.

Target groups

Masters students in Food Science. The course is also suitable for other masters students who have ETK-250 (Fundamentals of packaging technology) on record or exchange students who have studied food packag- ing in their BSc. Please observe the prerequisite: 5 cr packaging studies OR FOOD-118 book exam in the first general exam of September. The course will build up on prior knowledge. Highly recommended if the stu- dent plans to carry out their M.Sc. thesis in packaging technology related topic in another module.

Teaching period when the course will be offered

Periods I and II.

Recommended time or stage of studies for completion

1st year (recommended).

Study module

This course may be part of electives in the Advanced studies in Food Sciences and is a compulsory course in Food Packaging module. The course is also an optional in Product Development in the Food sector study module.

Expiry of studies

The course expires in 10 years.

Language of instruction

Teaching language on the course is English.

EQF level

Master's / EQF level 7

Study materials

EN: Literature assigned at lectures will be available through Moodle.

FOOD-605 Potential Novel Methods and Technologies

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FOOD-605 Potential Novel Methods and Technologies

Abbreviation: Potential Novel

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish

Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Jouppila, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Food Processing Technology related studies or equivalent knowledge.

Compulsory prerequisites

FOOD-101 Food Processing Technology

Equivalences to other studies

8720125 Potential Novel Processing Technologies ET420

Learning outcomes

EN: After the course the student can describe the working principle of several novel processing technolo- gies 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 technolo-
gies and major limitations of their use. The student can give illustrative examples on the use of the technologies in specific food processing applications. The student learns to explore data sources and formulate these in oral seminar presentations and written reports. The student will learn the principle of peer- reviewing and opposing and their roles in scientific communication. Group and project working skills are intended learning outcomes of this course.

Content

EN: Several novel food processing technologies and research methods as described during the first lecture.

Additional information

EN:

Completion methods

Contact teaching 14 h, group work 50 h, self study 69 h. Participation in group work. Active attendance in lectures and group meetings; meetings with the teacher and teaching seminars are compulsory.

Assessment practices and criteria

The grade is based on learning diary and examination (50%) and active group work including report, presenation and acting as an opponent (50%). The performance will be graded using the scale of 0-5.

Activities and teaching methods in support of learning

Reading scientific papers

Target groups

The course is optional 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 or related areas, e.g. exchange students. Priority is given to students choosing the Food Technology module.

Teaching period when the course will be offered

Period IV.

Recommended time or stage of studies for completion

1st or 2nd year or master studies

Study module

Optional in the Food Technology module or other modules.

Expiry of studies

10 years

Language of instruction

Teaching language is English.

EQF level

Master's / EQF level 7

Study materials

EN: Literature and study realisation will be described at the first course meeting and updated in Moodle during the course. Active reading of scientific papers.

FOOD-607 Food Solutions Master Class

FOOD-607 Food Solutions Master Class

FOOD-607 Food Solutions Master Class

Abbreviation: Food Solutions

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	10-15 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Mikkonen, Responsible teacher Hanna Koivula, Responsible teacher Laila Seppä, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

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

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Contact teaching 20 %, Group work 80 %

Assessment practices and criteria

The grade will be based on the student’s performance as team member, report, and final developed prod- uct.

Activities and methods in support of learning

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.

Target groups

The course is targeted for bachelor, master, and doctoral students. Students are selected on the course based on their CV, personal study plan and motivation letter.

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.

Recommended time or stage of studies for completion

According to the personal study plan.

Study module

The course is optional in the Food Technology and Product Development in the Food sector study modules.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: According to the case study.

FOOD-608 Literature Exam, Food Technology

FOOD-608 Literature Exam, Food Technology

FOOD-608 Literature Exam, Food Technology

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-6 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kirsi Mikkonen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Food Processing Technology or equivalent knowledge.

Compulsory prerequisites

FOOD-101 Food Processing Technology

Equivalences to other studies

FOOD-606 Literature Exam, Food Technology

Learning outcomes

EN: The student will have profound knowledge of Food Technology.

Content

EN: Food Technology

Additional information

EN:

Completion methods

Self study 54-162 h.

Assessment practices and criteria

The grade is based on examination. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Self-study.

Target groups

The course is optional for Food Sciences master’s students writing master’s thesis within the Food Technology study module.

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

1st or 2nd year

Study module

Optional in Food Technology study module.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Literature will be agreed.

FOOD-701 Food Crop Quality

FOOD-701 Food Crop Quality

FOOD-701 Food Crop Quality

Abbreviation: Food Crop Quali

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Frederick Stoddard, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences.

Equivalences to other studies

812110 Field Crop Quality

Learning outcomes

EN: 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 stu- dent 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.

Content

EN: Introduces the most important quality aspects of the main crops, including the main cereals, and meth- ods of assessing quality: what components determine quality for a given end use, how these are deter- mined genetically and how they may be affected by growing conditions. Theoretical background of meth- ods. The lectures of this course coincide with those of Field Crop Quality (AGRI-241), so credit cannot be gained for both courses.

Additional information

EN:

Completion methods

Lecture series, contact teaching 30 h, practical work 0 h, group work 0 h, independent study 51 h Assessment

practices and criteria

Examination 80%, lecture participation 20%. The performance will be graded using a scale of 0-5

Activities and methods in support of learning

Target groups

The course is available for students with bachelor level knowledge in food sciences.

Teaching period when the course will be offered

Period I

Recommended time or stage of studies for completion

1st or 2nd year

Study module

The course is compulsory in the Grain Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: 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 Uni- versity).

FOOD-702 Cereal Processing

FOOD-702 Grain Processing

FOOD-702 Cereal Processing

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5

University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kati Katina, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in food sciences. As prerequisites, ETK-123, ETK-215 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

Compulsory prerequisites

ETK-123 Food and Food Manufacturing Processes: Cereals and Pulses

ETK-215 Food Design and Processing

or

ETK-123 Food and Food Manufacturing Processes: Cereals and Pulses

ETK-215V Food Design and Processing, Grain Technology

Equivalences to other studies

8720144 Cereal Processing 1 and 2 (ET730/731)

Learning outcomes

EN: 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.

Content

EN: 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.

Additional information

EN:

Completion methods

Lecture series, contact teaching 35 h, self study 93 h, individual assignment 7 h.

Assessment practices and criteria

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

Activities and methods in support of learning

Target groups

The course is available for students with bachelor level knowledge in food sciences.

Teaching period when the course will be offered

Period III

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Grain Science and Technology study module.

Expiry of studies

10 years

Language of instruction

Teaching in English.

EQF level

Master's / EQF level 7

Study materials

EN: 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.

FOOD-703 Grain Technology, lab works

FOOD-703 Grain Technology, lab works

FOOD-703 Grain Technology, lab works

Abbreviation: Grain Technolog

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Noora Mäkelä-Salmi, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor level knowledge in Food Sciences. As prerequisite, the student must have attended Food Crop Quality and/or Cereal and Pulse Ingredient Functionality and Cereal Processing courses prior to the course.

Recommended prerequisites

FOOD-701 Food Crop Quality

FOOD-110 Cereal and Pulse Ingredient Functionality

FOOD-702 Cereal Processing

Equivalences to other studies

8720146 Cereal Technology lab works ET735

Learning outcomes

EN: After the course, the student can plan and conduct basic measurement of cereal product quality. The student is able to report, evaluate and discuss the results and understands the factors affecting the quali- ty. The student can conduct laboratory methods applied in the research of grain science and technology.

Content

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

Additional information

EN:

Completion methods

Practical laboratory works (compulsory attendance), written reports and lab book.

Assessment practices and criteria

Lab book 20%, reports 80%; graded using scale of 0-5.

Target groups

The course is compulsory for those doing the Master's thesis in the Grain Science and Technology study module.

The course is available for students of Master's programme in the Food Sciences. Maximum number of students is 10. Priority will be given to students who will do her/his Master's thesis in Grain Science and Technology study module. Other FOOD students with bachelor level knowledge in food science and with sufficient level of knowledge in grain science and technology (check prerequisites).

Teaching period when the course will be offered

Period IV

Recommended time or stage of studies for completion

1st year

Study module

The course is compulsory in the Grain Science and Technology study module for those doing the Master's thesis in it.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Background information and instructions will be provided during the course at the Moodle. Some suggested reading: Delcour & Hoseney 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.
The students will need to search for literature when writing the reports.

FOOD-704 Literature exam, Grain Science and Technology

FOOD-704 Literature exam, Grain Science and Technology

FOOD-704 Literature exam, Grain Science and Technology

Abbreviation: Literature exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	4 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Kati Katina, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Cereal Processing (FOOD-702) and Grain and Pulse ingredient Functionality (FOOD-110) completed or corresponding studies

Equivalences to other studies

8720149 Literature examination 2 ET790

Learning outcomes

EN: The student will have the profound knowledge in some specific field of grain science and

technology. Content

EN: Grain Science and Technology.
Student will select approximately 700 pages of scientific text (book, or several books) related to grain sci- ence and technology with prior agreement with responsible professor. Selection can be based on student's own interests or needs.

Additional information

EN:

Completion methods

Self study 133 h.

Assessment practices and criteria

The grade is based on examination. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

Teaching period when the course will be offered

Periods I-IV

Recommended time or stage of studies for completion

2nd year

Study module

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

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: The student will agree study material (scientific book and corresponding material) with responsible person. Cirka 700 pages.

FOOD-706 Problem Solving in Food Research

FOOD-706 Problem Solving in Food Research

FOOD-706 Problem Solving in Food Research

Abbreviation: FOOD-706

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible persons	Kirsi Jouppila, Responsible teacher

Noora Mäkelä-Salmi, Responsible teacher

Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Bachelor's degree in Food Sciences or equivalent completed.

Recommended prerequisites

KH80_003 Bachelor's Programme in Food Sciences

Equivalences (free text field)

EN: FOOD-706 Problem-Based Learning in Grain Science and Technology Research

Learning outcomes

EN: Student can use the problem-based learning approach to study challenging questions in food research, science and technology. Student learns to explore scientific data sources, make research plans and execute small research works. After the course, student can plan and carry out a study to solve clearly outlined, small research problem and report the study orally and in writing.

Content

EN: Problem-based learning method is applied in this course. Each student will plan and conduct research work aiming to solve some part of the given problem.

Additional information

EN:

Completion methods

Contact teaching, group work, independent studying, laboratory work (maximum one week), reporting.

Assessment practices and criteria

Research plan (50%) and reporting the results (oral presentation + report) (50%). The grading using scale 0-5.

Activities and teaching methods in support of learning

Problem solving in group, reporting orally and in writing.

Target groups

The course is available for students of Master's programme in the Food Sciences. Maximum number of students is 10. Priority will be given to students who will do her/his Master's thesis in Grain Science and Technology study module.

Teaching period when the course will be offered

Periods I and II; reporting will be done in period III.

Recommended time or stage of studies for completion

1st or 2nd year

Study module

The course can be included as an elective course in Grain Science and Technology study module.

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Student will search for relevant literature.

FOOD-801 Meat Technology, lectures

FOOD-801 Meat Technology, lectures

FOOD-801 Meat Technology, lectures

Abbreviation: Meat Technology

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Per Ertbjerg, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: FOOD-130 Meat and Meat Analog Science & Technology course or similar and basic knowledge in meat technology

Compulsory prerequisites

FOOD-130 Meat and Meat Analog Science & Technology

Equivalences to other studies

8720132 Meat Technology, lectures ET530

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Contact teaching and recorded videos 36 h, seminars 12 h, written essays, self-study 86 h

Assessment practices and criteria

Attendance to lectures, learning from the recorded videos and active participation in seminars, literature examination. The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

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 and Meat Analog Science & Technology lecture course or similar) and basic knowledge in meat technology.

Teaching period when the course will be offered

Period III

Recommended time or stage of studies for completion

1st year of Master's studies

Study module

The course is compulsory in the Meat Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

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

FOOD-804 Literature Exam, Meat Science and Technology

FOOD-804 Literature Exam, Meat Science and Technology

FOOD-804 Literature Exam, Meat Science and Technology

Abbreviation: Literature Exam

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Per Ertbjerg, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Meat Science and Meat Technology courses

Equivalences to other studies

8720134 Literature examination ET590

Learning outcomes

EN: 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.

Content

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

Additional information

EN:

Completion methods

Literature examination. Self-study 132 h

Assessment practices and criteria

The performance will be graded using a scale of 0-5.

Activities and methods in support of learning

Target groups

Open for Food Sciences Master's students

Teaching period when the course will be offered

Periods I-IV

Recommended time or 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. Study module

The course is compulsory in the Meat Science and Technology study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Advanced Technologies for Meat Processing, 2006, Edited by Nollet and Toldra. Other book(s) can be arranged individually.

FOOD-805 Meat Science and Technology, lab

FOOD-805 Lihatiede- ja teknologia, laboratoriotyö

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Per Ertbjerg, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Meat & Meat Analog Science & Technology lectures course, and also the Meat Technology lecture course taken simultaneously or earlier.

Equivalences to other studies

FOOD-802 Meat Science, lab work

FOOD-803 Meat Technology, processing lab

Equivalences (free text field)

EN: The course is a new combination of FOOD-802 Meat Science, lab work and FOOD-803 Meat Technology, processing lab.

Learning outcomes

EN: 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.

Content

EN: Meat and meat product analysis in relation to chemical, biochemical, and physical properties. Manufacturing of meat products and product development.

Additional information

EN:

Completion methods

Participation in teaching (laboratory work / final exam). The course cannot be completed as distance learn- ing

Assessment practices and criteria

Participation in activities, evaluation of performance and reports on practical work.

Activities and methods in support of learning

Target groups

The course is mainly available for students of Master's programme in the Food Sciences. Maximum number of students is 10. Priority will be given to students who will do her/his Master's thesis in the Meat Science and Technology study module.

Teaching period when the course will be offered

Period III

Recommended time or stage of studies for completion

The 1st year of the master's studies.

Study module

The course is included as compulsory in Meat Science and Technology study module if the Master's thesis is done in the study module.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: Lecture material and other material assigned to the course in Moodle.

FOOD-910 New Product development in food industry, a literature examination

FOOD-910 Tuotekehitys elintarvikealalla, kirjallisuuskuulustelu

FOOD-910 Produktutveckling inom livsmedelsbranchen, ett litteratur förhör

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3-5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Food Sciences 100%
Responsible person	Sari Ollila, Responsible teacher
Study level	Intermediate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: YET-104 course or other basic course of new product development management.

RECOMMENDED OPTIONAL STUDIES:

YET-340 Food Economy – module, 15 cr

Equivalences to other studies

87039 Literature 1 (EE039)

Learning outcomes

EN: After completing the course, the student:

- understands the specifics of the food industry in the product development process
- is able to identify the challenges of managing product development projects
- is able to identify key factors influencing the success of product development projects

Additional information

EN:

Completion methods

Personal examination in UH Examinarium electronic exam rooms.

Assessment practices and criteria

Activities and methods in support of learning

independent studying and written examination

Target groups

Course is open to all students when connected to the FOOD-900 study module.

Teaching period when the course will be offered

Yearly in all periods, contacting responsible teacher is required.

Recommended time or stage of studies for completion

Master's studies, 1st study year

Study module

Course is optional in the study module FOOD-900 Product development in food industry and can be executed only as a part of it.

Expiry of studies

10 years

Language of instruction

English

EQF level

Master's / EQF level 7

Study materials

EN: The course consists of the product development literature chosen by the student:

- For 5 credits, select 2 books (about 750 p.) from the list.
- For 3 credits, select 1 book (about 450 p.) from the list.

Select 1-2 books from the list:

- Beckley, J. H., Foley, M. M., Topp, E. J., Huang, J. C. & Prinnyawiwatkul, W. (eds) 2007. Accelerating New Food Product Design and Development. Blackwell Publishing. Available as an e-book. 360 pages.
- Earle, M. & Earle, R. 2008. Case Studies in Food Product Development. Cambridge: Woodhead Publishing. Available as an e-book. 377 pages.
- Fuller, G. W. 2011. New Food Product Development. From Concept to Marketplace. 3rd ed. CRC Press. Avail- able as an e-book. 441 pages. Note! If this book has already been examined as a part of food product development course (EE054 or YET-104), it cannot be selected.
- Moskowitz, H. R., Saguy, I. S. & Straus, T. 2009. An Integrated Approach to New Food Product Development. CRC Press. Available as an e-book. 469 pages.
- Trott. P. 2021. Innovation management and new product development. 7th ed. Pearson: Harlow. 546 p.