Department of Food and Environmental Sciences, University of Helsinki

Courses available for exchange and visiting students

The following courses are open for the exchange and visiting students at the Department of Food and Environmental Sciences, University of Helsinki. Please note, however, that these are advanced level courses (MSc level) and the courses have certain prerequisites, i.e. your previous studies (BSc level) need to provide the needed foundation for successful completion of the courses. For some courses there may also be a limitation regarding the number of participants. In these cases the priority is given for the degree students in the University of Helsinki.

Please note that the latest information about the courses is found in WebOodi. You can browse WebOodi without logging into the system, but you need to log in when you want to register for the courses.

Autumn term, periods I-II

		ECTS	Period	Arranged in odd or even years only
GENERAL COURSES/SUBJECT COURSES (no specific prerequisites needed)				
871061/864996	Orientation to Labour Market (EK230)/Work Life Orientation	1	according to agreement	
ADVANCED LEVEL COURSES (please note the prerequisites of each course)				
8720301	Dairy Sience and Technology 1 (ETT331)	2	I-II	
87148	Food additives (EK223)	3	I-II	odd
871072	Chemical Risk Factors (EK132)	5	II	
871003	European Food Legislation and Control (EK131)	3	II	
817600	Soil Fertility and Plant Nutrition for International Students (MAA545)	3 or 5	II-III	
85010	General and inorganic chemistry (YKEM010)	4	I-II	
85020	Basics of organic chemistry (YKEM020)	4	I-II	
864988	Food Microbiology (MIKRO233)	4	I-IV	
8720005	Meat Technology 1 (ETT150)	2,5	I-IV	
864989	Food and Environmental Hygiene and Control (MIKRO576)	5	I-IV	
817834	Environmental Soil Science Readings I (MAA270)	5	I-IV	
864063	Writing an essay in microbiology (MIKRO290)	5	I-IV	

Spring term, periods III-IV

		ECTS	Period	Arranged in odd or even years only
GENERAL COURSES/SUBJECT COURSES (no specific prerequisites needed)				
871061/864996	Orientation to Labour Market (EK230)/Work Life Orientation	1	according to agreement	
8720108	Bioethics and legislation	3	IV	
ADVANCED LEVEL COURSES (please note the prerequisites of each course)				
8720302	Dairy Sience and Technology 2 (ETT332)	2	III-IV	
882045	Nutritional problems in low income countries (RAV141)	3	IV	
8720062	Biobusiness (ETT740)	3	IV	
871073	Food Toxicology and Risk Assessment (EK133)	5	IV	**odd**
87145	Vitamins and other bioactive compounds (EK221)	5	IV	**even**
864988	Food Microbiology (MIKRO233)	4	I-IV	
8720005	Meat Technology 1 (ETT150)	2,5	I-IV	
850006	Biochemistry I (BKEM100)	5	III-IV	
864989	Food and Environmental Hygiene and Control (MIKRO576)	5	I-IV	
817834	Environmental Soil Science Readings I (MAA270)	5	I-IV	
864063	Writing an essay in microbiology (MIKRO290)	5	I-IV	

871061 Orientation to labour market (EK230), 1 cr

Timing	According to agreement.
Objective	The student gets and overview of possible working areas in the field of Food Sciences and learns the important skills needed for to start searching a job.
Completion	According to agreement. One possibility is to somplete the course Curriculum for Career.
Responsible person	Velimatti Ollilainen
Other information	Course can be also taken in English, according to agreement.

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864996 Work life orientation, 1 cr

Timing	According to agreement
Objective	The student gets an overview of possible working areas in the field of Environmental Sciences and learns the important skills needed for to start searching a job.
Completion	According to agreement. One possibility is to complete the course Curriculum for Career.
Responsible person	Tiina Naskali, Kristina Lindström

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8720108 Bioethics and legislation, 3 cr

Target group	MBIOT, HEBIOT, MScPPS, MScFood and MENVI Master's students
Timing	Spring term, period IV
Preceding studies	Bachelor's degree or equivalent in life sciences
Objective	The aim is to familiarise students with ELSA (Ethical, Legal and Social Aspects) in biological sciences
Contents	The course is composed of lectures, documentary film sessions, a panel discussion and students' presentations and divided by a two weeks' period when students prepare case study presentations on ELSA of chosen topics in small groups. The course will provide following themes: Introduction to ethical principles in science; Good scientific practices, misconduct of research and plagiarism; Science information services, public perception; ELSA in biomedical research and applications; ELSA in food production and food security, in agricultural practices, in environmental matters and in current issues in developing countries (climate change, biodiversity, bio-energy and patenting issues)
Study materials and literature	Material will be provided during the course
Completion	Lectures, films and a panel discussion; Group work (preparation and presentation of the case studies); Independent study (learning diary)
Evaluation	Attendance 85%; Active contribution to the panel discussion; Active contribution to the preparation and presentation of the case study; Learning diary. Scale: Pass/fail
Responsible person	MBIOT, HEBIOT, MScPPS, MScFood and MENVI coordinators
Other information	Priority is given to HEBIOT, MBIOT, MScPPS, MScFood and MENVI Master's students

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8720301 Dairy Sience and Technology 1(ETT331), 2 cr

Timing	Master studies, 1st year, periods I-II
Objective	The student understands the milk properties, properties of LAB starters for fermented milks, main unit operations covering from the raw milk to the liquid dairy products, manufacture, quality control and shelf life of liquid dairy products.
Contents	Lectures on milk chemistry, biochemistry and microbiology, basic dairy processing and on manufacture and properties of liquid non-fermented and fermented milk products.
Study materials and literature	Material provided during the course.
Completion	Contact teaching 26 h, self study 28 h
Evaluation	Exam, grades: 1-5
Responsible person	Tapani Alatossava
Other information	The course is obligatory to the dairy technology students and elective to the students of the MScFood programme.

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87148 Food additives (EK223), 3 cr

Timing	Master studies, 3rd year, periods I + II (Given in uneven years only)
Preceding studies	YKEM100 (or YKEM010 and YKEM020) and YKEM101 (basic chemistry knowledge)
Objective	The student becomes acquainted with the chemical properties and technological properties of food additives.
Contents	Chemical properties, interaction reactions with other food constituents, technological purpose, nutritional factors, safety, and the European legislation on food additives.
Study materials and literature	Material provided during the course.
Completion	Lecture series + written essay. Contact teaching 28 h, practical work 0 h, group work 0 h, self study 52 h
Evaluation	Examination and a written essay
Responsible person	Marina Heinonen
Other information	The course will be given in uneven years only.

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871072 Chemical Risk Factors (EK132), 5 cr

Timing	Master studies, period II
Objective	This lecture course introduces students to the chemical hazards and risks related to the food chain. Students are familiarized with the main chemical hazards and their backgrounds. After this course students are able to estimate the relevance of the chemical hazards to the food production chain.
Contents	Chemical hazards: structures, reactivity, analytical methods, occurrance in foods or feeds. Significant for human health i.e chemical safety (occurrence, intake, ADI). Environmental aspects. Course deals with heavy metals, POPs, "the Dirty Dozen" compounds, nitrate, allergenes, natural born toxins, medicine residues, food additives, dietary supplements, hazardous compounds derived from food processing or food packaging, pesticide residues.
Study materials and literature	Material provided during the course.
Completion	Lecture series, Moodle learning system. Contact teaching 40 h, practical work 0 h, group work 0 h, self study 92 h
Evaluation	Examination and/or a written essay.
Responsible person	Velimatti Ollilainen

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871003 European Food Legislation and Control (EK131), 3 cr

Timing	Period II
Objective	This course introduces students to the European regulations on food, action of European Food Safety Authority (EFSA,) Food control system in Finnish Food Safety Authority (EVIRA), Finland.
Contents	Lectures dealing with national and EU legislations, food control in EU. Actions of European Food Safety Authority, European Chemical Agency ECHA, Finnish Custom Laboratory. Control of imported goods, Case studies; food control systems in the retail market chains, control of imported goods, action of Finnish Custom Laboratory.
Study materials and literature	Material provided during the course.
Completion	Lecture series, Moodle learning system. Contact teaching 28 h, self study 52 h.
Evaluation	Examination and/or a written essay.
Responsible person	Velimatti Ollilainen

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817600 Soil fertility and plant nutrition for international students (MAA545), 5 cr

Target group	This course is arranged principally for the international students enrolling the Masters Programme of Plant Production Sciences (MScPPS) and Masters Programme of Environment and Natural Resources (MENVI).
Timing	Start of the course in Period II; dead-line for the term papers at the end of Period III. Written exam on the fixed examination days of Environmental Soil Science / Department of Food and Environmental Sciences. An oral exam will be arranged within two weeks after passing the written exam.
Preceding studies	The student must have basic knowledge of soil science and plant nutrition. In the first place, this level should have been achieved at the home university in the courses available in most agricultural faculties in the world, such as Principles of Soil Science and Plant Nutrition (or its equivalent). Alternatively, the student can obtain this level of knowledge by passing the literature exam MAA270 (Environmental Soil Science Readings I).
Objective	The student gets a review of soil constituents and properties important in soil fertility. After the course the student knows the processes of organic matter turnover, nitrogen, phosphorus, potassium and sulphur cycles, the impact of acidity, alkalinity and salinity on crop growth impact of soil pH on the availability of different nutrients and knows the most important fertilizers, factors controlling the response to fertilization and processes leading to the losses of plant nutrients from soil. The student also becomes familiar with the specific topic selected for a term paper (essay). While composing the term paper the student learns how to effectively find literature on a certain topic and becomes familiar with the thesis format required by the faculty.
Contents	Soil - plant relationships, plant nutrients and fertilizers, soil fertility evaluation, basics of nutrient management, interaction of nutrients and other growth factors, agricultural productivity and environmental quality. The students also write a term paper (essay) on a selected topic of their interest. The term paper is based on scientific literature selected and searched by the student. The group of students enrolling on this course meets with the teacher 3-5 times during the study process for discussions and feedback for their term paper drafts.
Study materials and literature	1. 1. J.L. Havlin, J.D. Beaton, S.L. Tisdale & W.L. Nelson: Soil Fertility and Fertilizers. An Introduction to Nutrient Management. 7. ed. Pearson - Prentice Hall, Upper Saddle River, New Jersey, USA. 515 pp. 2. Material needed for writing the essay (term paper).
Completion	The student 1) reads the text book with the help of a list of about 150 study questions furnished by the teacher and 2) writes individually a 10-15 page essay (term paper) on a topic of their interest. 3cr by passing only the exam and 5cr by passing the exam and writing a term paper
Evaluation	Evaluation of the essay (term paper) (30 %). Written and oral examination (70 %).
Responsible person	Professor Markku Yli-Halla

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85010 General and Inorganic Chemistry (YKEM010), 4 cr

Timing	Autumn term, period I
Objective	To learn basics in chemistry
Contents	Course covers basic concepts in chemistry, structure and properties of elements / compounds, information obtained from the chemical formulas and reactions, different chemical bonds and interactions, reaction types, equilibrium reactions, concepts of pH and buffer, reaction kinetics and heat, and basic calculations in chemistry.
Study materials and literature	Chang, R. (2008) General Chemistry - The Essential Concepts. Theory practices: YKEM010/020 teoriaharjoitukset (in Finnish)
Evaluation	The course has a final exam (book exam for the English speaking students). Three retakes will be organized in the general examination days of the division of Chemistry and Biochemistry. Programmable calculators are not allowed in the exams.
Responsible person	Maija Tenkanen
Other information	Lectures given in Finnish. English speaking students have a book exam.

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85020 Basics of organic chemistry (YKEM020), 4 cr

Timing	Autumn term, period II
Objective	To learn basics in organic chemistry
Contents	Course covers basic concepts in organic chemistry, structures of essential functional groups and compounds in organic chemistry and biochemistry, naming, reactivity and physical properties of organic compounds.
Study materials and literature	McMurry, J. (2003) Fundamentals of Organic Chemistry. Theory practices: YKEM010/020 teoriaharjoitukset (in Finnish)
Evaluation	The course has a final exam (book exam for the English speaking students). Three retakes will be organized in the general examination days of the division of Chemistry and Biochemistry. Programmable calculators are not allowed in the exams.
Responsible person	Maija Tenkanen
Other information	Lectures given in Finnish. English speaking students have a book exam.

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864988 Food Microbiology (MIKRO233), 4 cr

Timing	Master studies, 1st year, study periods I-IV.
Objective	The student understands how the microbes are distributed into the food chain, the effect of intrinsic and extrinsic factors on microbial growth, how microbes can be inhibited in foods, how microbes are detected and quantified in foods, basics of self control and HACCP, microbial quality and quality control. The student can explain food spoilage processes and recognize the hazards of food and water pathogenic microorganisms and parasites including toxin production (mould, cyanobacterial and algae toxins, biogenic amines and prions).
Contents	Ecology of microbes, intrinsic and extrinsic factors of food, technological methods for inhibition of microbes, self control and HACCP, microbiological quality, spoilage of foods, food and waterborne pathogens.
Study materials and literature	J.M. Jay et al. Modern Food Microbiology, 7th edition. Springer Science + Business media Inc. 2005, NY, USA. Parts I, II, III, V and VI. Additional material is found on the Moodle platform.
Completion	Literature examination. Corresponding lectures (MIKRO231 period III) are given in Finnish.
Evaluation	Literature examination. Written examination takes place on general examination dates. Registration through WebOodi.
Responsible person	Per Saris

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8720005 Meat Technology 1 (ETT150), 2.5 cr

Timing	Period III
Objective	Students will know the chemistry, microbiology and technology of meat and meat products. Students will also know the legislation concerning these issues.
Evaluation	Literature examination
Responsible person	Marita Ruusunen
Other information	Lectures held in Finnish

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850006 Biochemistry I (BKEM100), 5 cr

Timing	Spring term, period III
Preceding studies	YKEM010 and YKEM020 (earlier YKEM100) or equal knowledge required
Objective	An introduction to the structure and function of the main groups of macromolecules in cells, to biological membranes and to transport. The main ideas of energy metabolism will be covered.
Contents	The general structure and main functions of proteins, enzymes, lipids and carbohydrates. Transport and basics of biosignaling in biological membranes. Includes an overview of energy metabolism in cells.
Study materials and literature	• Horton, H. R., Moran, L. A., Scrimgeour, K. G., Perry, M. D., Rawn, J. D., 2006, Principles of Biochemistry
Completion	The first examination is organized at the end of the course, two retakes will take place at the general examination days of the division of Chemistry and Biochemistry. Lectures 40, independent study 93 hours
Responsible person	Marko Virta
Other information	The language of instruction is Finnish, but the course can be taken as a literature examination in English. Contact the instructor for the details.

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864989 Food and Environmental Hygiene and Control (MIKRO576), 5 cr

Timing	Master studies
Preceding studies	Basic microbiology knowledge required
Objective	The student can evaluate and apply the basics of environmental hygiene and control.
Contents	Epidemiological studies, food control in Finland and elsewhere, hygiene, selfcontrol, HACCP, certificate of hygiene skills, water, environmental and food standards, food, zoonotic and environmental pathogens, isolation and typing of pathogens.
Study materials and literature	J.M. Jay et al. Modern Food Microbiology, seventh edition. Springer Science + Business media Inc. 2005, NY, USA. Parts IV, VI and VII. Additional material is found on the Moodle platform. It is recommended to listen to the lectures of the course EK131 European Food Legislation and Control at the same time.
Completion	Literature examination. Corresponding lectures (MIKRO575, period II) are given in Finnish every second year.
Evaluation	Literature examination
Responsible person	Per Saris
Other information	Written examination takes place on general examination dates. Registration through WebOodi.

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817834 Environmental Soil Science Readings I (MAA270), 5 cr

Timing	Certain examination dates in all semesters (3-5 examination dates each semester).
Preceding studies	Basic knowledge of chemistry is required.
Objective	After passing the literature exam the student knows the most important soil constituents, i.e., clay minerals, organic matter, iron and aluminium oxides, and carbonates and understands their physical and chemical properties and reactions such as cation exchange and anion retention. Learning objectives also include the concepts of soil texture and soil structure, understanding soil hydrology and soil aeration. Chemical characteristics such as soil acidity and salinity and cycles of different elements in soil (particularly nitrogen, phosphorus, potassium, other plant nutrients and heavy metals), the principles of plant nutrition and soil fertility, soil erosion and its control and functions of soil in the ecosystem in general are emphasized.
Contents	Written and oral examination
Study materials and literature	1. N.C. Brady & R.R. Weil: The Nature and Properties of Soils. 13. painos. 960 s. Prentice Hall, 2002, or a more recent edition.
Evaluation	Written and oral examination.
Responsible person	Professor Markku Yli-Halla
Other information	By passing this literature examination foreign students who have sufficient knowledge of chemistry become eligible to enrol on the Soil Science Laboratory course (MAA265). A comprehensive list of study questions can be obtained from the teacher.

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864063 Writing an essay in microbiology (MIKRO290), 5 cr

Timing	period I-IV
Objective	To learn scientific writing and to get familiar with the sources of microbiological knowledge.
Contents	Introduction to the creation and publication of microbiological knowledge. Use of scientific library and databases, source criticism.
Completion	Self study 133 h
Evaluation	Written essay.
Responsible person	Kristina Lindström
Other information	Separate discussion with the responsible teacher needed in order to accomplish.

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8720302 Dairy Sience and Technology 2 (ETT332), 2 cr

Timing	Master studies, 1st year, periods III-IV
Objective	The student is familiar with the characteristics of cheeses, butter, milk and whey powders and protein isolates, and recent dairy biotechnology.
Contents	Lectures on manufacture and ripening of cheeses, cheese starters and adjunct cultures, whey bioprocessing, butter, and separation and enzyme technologies for various milk components.
Study materials and literature	Material provided during the course.
Completion	Contact teaching 26 h, self study 28 h
Evaluation	Exam, grades: 1-5
Responsible person	Tapani Alatossava
Other information	This course is obligatory to the dairy technology students and elective to the students of the MScFood programme.

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87145 Vitamins and other bioactive compounds (EK221), 5 cr

Timing	Master studies, 3rd year, period IV (Given in even years only)
Preceding studies	YKEM100 (or YKEM010 and YKEM020), YKEM101 and BKEM100, or equivalent knowledge
Objective	To understand the chemistry, reaction mechanisms, occurrence, and functions of vitamins and other bioactive compounds.
Contents	Chemical and biochemical properties, principal mechanisms of action (bioactivity) and analytical methods regarding vitamins and other bioactive compounds such as carotenoids, flavonoids and phenolic acids, phytoestrogens, purines and phytosterols.
Study materials and literature	Belitz, H.-D. et al. *Food Chemistry*, 2004 Material provided during the course. Supportive reading: Damodaran, S. Parkin, K.L., Fennema, O.R. Fennema's Food Chemistry, 4. ed., CRC Press Inc., New York, 2007. Belitz, H.-D., Grosch, W., Schieberle, P. *Food Chemistry*. 3.ed, Springer, Berlin, 2004.
Completion	Lecture series, contact teaching 46 h, practical work 0 h, group work 0 h, self study 88 h.
Evaluation	Written essay or examination.
Responsible person	Marjo Poutanen
Other information	The course will be given only in even years.

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882045 Nutritional problems in low income countries (RAV141), 3 cr

Timing	Period IV
Objective	Students will understand the problems of child and maternal malnutrition in low-income countries including their underlying factors and physiological consequences
Contents	Food habits in Africa and Asia, reasons and forms for child and maternal malnutrition, physiological consequences of the malnutrition, role of international NGOs, food security.
Completion	Contact teaching 28 h, practical work 0 h, group work 0 h, self study 52 h.
Evaluation	Examination
Responsible person	Marja Mutanen

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8720062 Biobusiness (ETT740), 3 cr

Timing	Spring term, period IV
Preceding studies	Preferably studies in food science
Objective	The student knows basics of innovation systems, intellectual property rights, patenting and possibilities for IPR based business.
Contents	Case studies in food sector. Relevant patents and patent applications and other IPR studied. Making of a virtual patent application, dealing with it, including a simple business plan.
Study materials and literature	Material provided during the course. Patents: Basic Facts. Application Guide. Essential Reading. UK Intellectual Property Office.
Completion	Project work. Contact teaching 20 h, practical work 10 h, group work 10 h, self study 42 h.
Evaluation	Project report. Oral presentations. Final examination.
Responsible person	Hannu Salovaara
Other information	max. 15 students; master’s degree students have the priority to the course.

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871073 Food Toxicology and Risk Assessment (EK133), 5 cr

Timing	Master studies, period IV. Offered every odd year.
Objective	The aim is to understand the principles of safety assessment of food and food ingredients.
Contents	Basic principles of toxicology (clinical testing, basic concepts), principles of nutritional physiology, metabolic reactions of chemical risk factors, principles of risk assessment.
Study materials and literature	Material provided during the course.
Completion	Lecture series. Contact teaching 30 h, practical work 0 h, group work 0 h, self study 102 h
Evaluation	Examination and/or a written essay
Responsible person	Marina Heinonen

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