

COURSE CATALOGUE for Exchange students

2026/27 Academic year

The **Institute Food Science and Technology of MATE at Buda Campus** is currently offering the following core courses for the 2026/27 academic year Fall semester. **Additional courses will be announced before the start of the semester, providing a wider range of courses to choose from.**

Exchange students are integrated with full degree international students during the semesters' workflow in the following study programmes:

- **BSc Food Engineering**
- **MSc Food Science and Technology Engineering**
- **MSc Food Safety and Quality Engineering**

Exchange students can take both bachelor's and master's subjects regardless of their study level or semester; however, timetable conflicts may occur.

*- A limited number of ERASMUS students can be admitted.

** - The course will only start if there is a sufficient number of students.

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1 BSc program - Food Engineering – Fall semester

1.1 Biology

| | |
|---|-------------------|
| Course title: Biology | Credits: 3 |
| Subject code: ELTUD030N | |
| Nature of the course: obligatory course | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: offered grade on the basis of mid semester written tests Other ways to be applied in evaluation: | |
| Place in training: 1st semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| Biology focuses on the basic principles of cell biology, phytology and zoology. This course provides basic knowledge on the structure and function of prokaryotic and eukaryotic cells, types, structures and functions of plants and animals at both tissue and body levels. | |
| <i>Required and recommended reading:</i> Campbell NA, Reece JB, Urry LA, Michael L. (2008) Campbell Biology. 8th ed. Pearson Benjamin Cummings, ISBN: 9780805368444. James D. Mauseth: Botany: An Introduction to Plant Biology | |
| Responsible instructor: Andrea Taczman Brückner, PhD | |
| Teacher(s) involved in teaching of the subject: Viktória Dobó | |

1.2 General Microbiology*

| | |
|---|-------------------|
| Course title: General Microbiology Subject code: ELTUD015N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) + 26 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: colloquium Other ways to be applied in evaluation: practice written tests | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| Within the confines of lectures, the morphology of microbes, cell structure, organelles and function will be reviewed. Furthermore, the principles and kinetics of microbial growth, genetic background of properties and the main microbial metabolic pathways will be discussed with examples. Basic methods in microbiology (investigation of macro- and micromorphology, metabolic processes) are also discussed and applied in practice, as well. | |
| Required and recommended reading: Brock Biology of Microorganisms (Madigan – Martinko - Stahl – Clark), Benjamin Cummings, 2012 Alcamo’s Fundamentals of Microbiology (Jeffrey C. Pommerville), Jones and Bartlett Publishers, 2011 | |
| Responsible instructor: Mónika Kovács, PhD | |
| Teacher(s) involved in teaching of the subject: Ágnes Belák, PhD; Andrea Pomázi, CSc; Andrea Taczman-Brückner, PhD | |

1.3 Food Chemistry 1 (theory)

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|--|-------------------|
| Course title: Food Chemistry 1 Subject code: ELTUD067N | Credits: 3 |
| Nature of the course: obligatory course | |
| „Training character“: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: oral or written exam Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (autumn) | |
| Prerequisites: Undergraduate courses in Inorganic Chemistry, Organic Chemistry, and Biochemistry or equivalent background knowledge | |
| Course Objectives: | |
| The aim of the Food Chemistry course is to provide students with an overview of the chemical and physical properties of the food components, and to understand the close relationship between their structure and functionality. The course covers the chemical structures and properties of water, carbohydrates, amino acids, proteins, fatty acids, lipids, minerals, vitamins, and their functions in food systems, in addition food toxicants, and a short summary of common analytical techniques. | |
| Required and recommended reading: Belitz H-D., Grosch W.: Food Chemistry. Springer Verlag, 2009. Velisek J.: The Chemistry of Food, Wiley, 2014. | |
| Responsible instructor: Prof. Dr Livia Simon Sarkadi, DSc, full professor | |
| Lecturer: Prof. Dr Livia Simon Sarkadi, DSc, full professor | |

1.4 Analytical Chemistry for Food and Bioengineering

| | |
|--|-------------------|
| Course title: Analytical Chemistry for Food and Bioengineering | Credits: 3 |
| Subject code: ELTUD398N | |
| Nature of the course: obligatory course | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 39 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: <i>familiar knowledge in general, inorganic and organic chemistry</i> | |
| Course Description: | |
| An introduction to food analysis. Basic concepts, rules and methods applied in of food and biomaterial sampling and sample preparation. Introduction to classical food analytical methods (e.g., various titration methods, Soxhlet fat and Kjeldhal protein methods). Understanding the analytical methods for the determination of macro components (water, fat, acidity, salt, sugar, protein, starch, fibre) of food and biomaterials. Introduction to bioanalytical and instrumental analytical chemistry: basics of electroanalysis (pH measurement), chromatography and spectroscopy. Examples for analytical calculations. | |
| <i>Required and recommended reading:</i> Nielsen's Food Analysis, (or any textbook on food analytical methods) | |
| Responsible instructor: László Abrankó, PhD | |
| Teacher(s) involved in teaching of the subject: | |

1.5 Measurement Technology in Food Industry *

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|--|-------------------|
| Course title: Measurement Technology in Food Industry Subject code: ELTUD104N | Credits: 3 |
| Nature of the course: mandatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + laboratory practice (credit%) 33% theory / 67% practice (kredit%) | |
| Course type: lecture course and lab course number of hours per semester: 13 (lecture) + 26 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: case studies, project teamwork, student presentation | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: practical exam (week 7), all practicals are validated by question at the end, written test yield offered grade | |
| Place in training: 3rd semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: | |
| The main purpose of the subject is to provide information about electric sensors, machines, present their advantages and limitations. Students will be able to select the appropriate one for specific tasks and can perform simple design calculations.. Curriculum (Lecture / Practice): 1., Requirements. Measurement and error. / Introduction, preparatory test. 2., Capacitor based sensors. / Working with multimeters. 3., Resistor based sensors. / M1 – Electronic measurements. 4., Coil based sensors. / M2 – Analysis of accumulators. 5., DC circuits for measurements. / M3 – Analysis of rotary machines. 6., AC circuits for measurements. / M4 – Semiconductor circuits: proximity and motion sensors. 7., Pulsed electric field. / Evaluation of practicals (exam measurements) 8., Features of accumulators. / S1 – Capacitor based sensors. 9., Features of DC machines. / S2 – Resistor based sensors. 10., Ultrasonic measurements and treatments. / S3 – Analysis of accumulators. 11., Computer vision. / S4 – Analysis of machines. 12., Spectroscopy. / Written test. 13., Selected case studies. / Supplementation of missing practicals and written test. | |
| Required and recommended reading: <ul style="list-style-type: none"> • Shared documents and videos on the e-learning site Class code: 1FA35NAK04B or ELTUD104N • N.E. Battikha: The Condensed Handbook of Measurement and Control. 2017. International Society of Automation. ISBN 978-1945541384 • Kourosh Kalantar-zadeh: Sensors: An Introductory Course. 2013. Springer. ISBN 978-1461450511 • https://www.springer.com/gp/book/9781461450511 | |
| Responsible instructor: László Baranyai, PhD | |
| Teacher(s) involved in teaching of the subject: Dr. Zsorné Dr. Muha Viktória, PhD, Kertész István, PhD | |

1.6 Basics of Raw Materials *

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|--|-------------------|
| Course title: Basics of Raw Materials Subject code: ELTUD138N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + laboratory practice (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) + 13 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: The grade given for the subject is formed from the results of the written exam during the examination period. Other ways to be applied in evaluation: Each student must complete 3 practices during the semester, with a minimum of 80% of the student's marks in each practice. | |
| Place in training: 3rd semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: The subject provides comprehensive knowledge of the most important characteristics, nutritional and physiological significance and quality requirements of the raw materials in the food industry (fruits, vegetables, cereals, industrial plants, meat, egg and milk). The student is introduced to the methods and aspects of raw material qualification. | |
| <i>Required and recommended reading:</i> Shared documents and videos on the e-learning site | |
| Responsible instructor: Géza Hitka, PhD | |
| Teacher(s) involved in teaching of the subject: Klára Pásztor-Huszár, Katalin Badak-Kerti, Zsuzsanna Kiss, Adrienn Varga-Tóth, Gábor Jónás, Karina Hidas, József Surányi | |

1.7 Knowledge of Livestock Products Technologies 1 **

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|--|-------------------|
| Course title: Knowledge of Livestock Products Technologies 1 Subject code: ELTUD009N | Credits: 3 |
| Nature of the course: obligatory course (The course will only start if there is a sufficient number of students.) | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 5th semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| In the framework of the course, students will learn about the situation of the dairy, poultry and meat industries in Hungary and the EU, the structure and opportunities of the industries concerned. During the semester, students will learn the basics of dairy farming, the composition of milk, the physical, chemical, microbiological and colloidal characteristics of milk and the centralised milk grading system. Students will learn about primary and general technological operations and equipment in the meat, poultry and dairy industries. Importance and composition of meat, livestock species and breeds, slaughtering techniques, meat grading, and storage processes are discussed. Students will learn about meat biochemistry, aging processes, additives used in the meat industry and poultry processing technologies. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Klára Pásztor-Huszár, PhD | |
| Teacher(s) involved in teaching of the subject: Klára Pásztor-Huszár, PhD; Ildikó Csilla Nyulas-Zeke, PhD, József Surányi | |

1.8 Knowledge of Postharvest Technologies 1**

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|---|-------------------|
| Course title: Knowledge of Postharvest Technologies 1 Subject code: ELTUD020N | Credits: 3 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 5th semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| The course provides an overview of the methods of handling food products. This semester will focus on the storage and logistics of food of animal origin and the related quality control tasks. Students will gain an insight into the inventory management of meat, meat products, milk and dairy products, eggs, fish, ready to eat meals and catering. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: György Kenesei, PhD | |
| Teacher(s) involved in teaching of the subject: György Kenesei, PhD; Karina Ilona Hidas, PhD, József Surányi, Géza Hitka, PhD | |

1.9 Packaging Technology

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|---|-------------------|
| Course title: Packaging Technology Subject code: ELTUD040N | Credits: 3 |
| Nature of the course: compulsory optional course | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 13 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 5th semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| <p>The objective of this course is to provide students with an understanding of the role and function of food packaging. To acquire a broad knowledge of the groups, properties and production methods of different packaging materials and devices. Gain an insight into the storage, transport and distribution of foodstuffs and their requirements. During the semester, students will become familiar with basic packaging machines, the principles of their operation and their integration into the food production process. Students will acquire knowledge of modern and innovative packaging materials, new packaging technology processes and machinery, current regulations on packaging.</p> | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Beatrix Szabó-Nótin, PhD | |
| Teacher(s) involved in teaching of the subject: Beatrix Szabó-Nótin, PhD; Julianna Kereszturi | |

1.10 How to write a thesis?*

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|---|-------------------|
| Course title: How to write a thesis? | Credits: 3 |
| Subject code: ELTUD090N | |
| Nature of the course: compulsory elective course (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 13 (lecture) + 13 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 5th semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| The aim of this course is to help students to write their thesis in accordance with the relevant formal and content requirements. They will be given information on what parts a thesis has and what requirements their thesis must meet. They will be informed about how to choose literature and which databases to use. They will also learn the basics of text and image editing. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Viktória Zsom-Muha , PhD | |
| Teacher(s) involved in teaching of the subject: Adrienn Varga-Tóth, Éva Illési, Tamás Zsom | |

2 MSc - Food Science and Technology Engineering – Fall semester

2.1 Technology and Product Innovation*

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|--|-------------------|
| Course title: Technology and Product Innovation Subject code: ELTUD180N | Credits: 5 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 52 (lecture) + 39 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: | |
| Evaluation: test on technical terms, exam mark: The grade given for the subject is formed from the results of the written exam during the examination period. Other ways to be applied in evaluation: Presentations, and laboratory reports | |
| Place in training: 1st semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| The aim of the course is to provide students with knowledge about the need for product development and the steps of development. The course presents the steps of product development implementation from idea to implementation, from economic evaluation to consumer testing. Students become able to assess and implement the need for product development. | |
| Required and recommended reading: - Gordon W. Fuller New Food Product Development G.W. Fuller Associated Ltd, Montreal, Canada, 2004 ISBN: 0-8493-1673-1 - Aaron L. Brody, John B. Lord: Developing New Food Product for a Changing Marketplace USA, 2007 ISBN: 0-8493-2833-0 - Robert C. Baker, Patricia Wong Hanh, Kelly R. Robbins Fundamentals of New Food Product development USA, 1988 ISBN: 0-44-41688-9 | |
| Responsible instructor: Géza Hitka, PhD | |
| Teacher(s) involved in teaching of the subject: Lilla, Szalóki-Dorkó, Beatrix Szabó-Nótin, PhD; László Ferenc Friedrich, PhD; Klára Pásztorné Huszár, PhD; Adrienn Vargáné Tóth, PhD; Géza Hitka, PhD | |

2.2 Mass and Energy Transfer Processes*

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|---|-------------------|
| Course title: Mass and Energy Transfer Processes Subject code: ELTUD018N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practice (credit%) | |
| Course type: lecture course and calculation course number of hours per semester: 26 (lecture) + 13 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: exam mark Other ways to be applied in evaluation: design exercise | |
| Place in training: 1st semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: | |
| <ol style="list-style-type: none"> 1. Mathematical modelling of batch and continuous processes. Balance equations for steady state and unsteady-state operation. The film concept and the mass transfer processes. Similarity of heat and mass transport. 2. Principles of absorption. Phase equilibria. Mass balances, determination of minimal solvent flow rate. Estimation of the number of theoretical stages. Absorber design. 3. Design of absorber (calculation exercise) 4. Principles of adsorption, isotherms. 5. Phase diagrams of ideal and non-ideal liquid-vapor mixtures. Continuous and batch distillation. 6. Calculation exercises of continuous and batch distillation. 7. Operation of continuous rectification, equations of operating lines, determination of Number of Theoretical Stages. Possible values of reflux ratio. 8. Calculation exercises of continuous rectification. 9. Batch rectification (multistage distillation). Theory and calculation exercises. 10. Steady-state and unsteady-state heat transfer in solids and in liquids. Temperature profiles. 11. Calculation exercises of Unsteady-state heat transfer. 12. Unsteady-state diffusion. Theory and calculation exercises. 13. Batch drying. Prediction of drying time from drying rate data | |
| <i>Required and recommended reading:</i> <ul style="list-style-type: none"> • Bird, Stewart, Lightfoot 2001. Transport phenomena. Wiley International. • Hallström, Skjöldebrand, Tagardh 1998. Heat transfer and food products. Elsevier. • Sattler, Feindt. 1995. Thermal Separation Processes. VCH • Toledo, 2007. Fundamentals of Food Process Engineering, Springer. • D. Basmadjian, 2007. Mass Transfer and Separation Processes, CRC Press | |
| Responsible instructor: Szilvia Bánvölgyi, PhD | |
| Teacher(s) involved in teaching of the subject: - | |

2.3 Complex Food Analytical Methods*

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|--|-------------------|
| Course title: Complex Food Analytical Methods Subject code: ELTUD073N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 39 (lecture) + 26 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 1st semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| The course provides a comprehensive overview of food quality testing procedures for food professionals. The background and applications of the applied analytical, physical, rheological and sensory methods are discussed in theoretical lectures. Half of the course consists of laboratory exercises and completion of related test reports. This course develops competence about the options for instrumental food testing. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: | |
| Teacher(s) involved in teaching of the subject: | |

2.4 Advanced Consumer Sensory Methods*

| | |
|---|-------------------|
| Course title: Advanced Consumer Sensory Methods Subject code: ELTUD115N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + laboratory practice (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 13 (lecture) + 26 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: exam mark Other ways to be applied in evaluation: | |
| Place in training: 1st semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Attila Gere, PhD | |
| Teacher(s) involved in teaching of the subject: - | |

2.5 Animal Product Technologies and Developments*

| | |
|--|-------------------|
| Course title: Animal product technologies and developments Subject code: ELTUD011N | Credits: 7 |
| Nature of the course: elective course (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + laboratory practice (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 52 (lecture) + 26 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: laboratory reports | |
| Place in training: autumn semester | |
| Prerequisites: - | |
| Course Objectives: <p>The course provides knowledge about raw materials of livestock products, their microbiology and biochemical characteristics. Microbiological, physico-chemical, biochemical and physical methods of preservation of food of livestock origin, theoretical background of the most widely used methods are discussed. Possibilities to hinder food spoilage processes are studied. Minimal processing technologies (high hydrostatic pressure, ultrasound, sous-vide technologies etc.) and their potential in ensuring food quality and extending shelf-life of foods is introduced. Role of starter cultures during food processing, mechanisms of action, role of live flora in development of product characteristics are included into the curriculum. The course helps students to understand the principles of technofunctional properties of meat paste and development of gel structure. Microbiological and enzymological background of acid fermentation and rennet coagulation, gel structure development of curd are presented. Role of microbiological and biochemical reactions in the development of organoleptic characteristics during cheesemaking and ripening are surveyed. Biochemical background of processes taking place during curing, possibilities to accelerate processes (tumbling, ultrasound) are studied. Determination of product development trends, extension of shelf life, introduction of new packaging materials and additives.</p> <p>Laboratory and pilot-scale practicals are part of the course as well.</p> | |
| Required and recommended reading: Lawrie, R.A., Ledward, D.A. (2006): Lawrie's meat science. Cambridge, Woodhead Publishing. ISBN: 9781845691592 - Goff, D.: Dairy Science and Technology. Dairy Science and Technology Education. University of Guelph. Canada. www.foodsci.uoguelph.ca/dairyedu/home.html - Sun, D-W. (ed.) (2014): Emerging Technologies for Food Processing. (2nd ed.) London. Academic Press. ISBN: 9780124114791 | |
| Responsible instructor: Klára Pásztor-Huszár, PhD | |
| Teacher(s) involved in teaching of the subject: Friedrich László, PhD., Dalmadi István, PhD., Jónás Gábor, PhD., Dr. Kenesei György, PhD. | |

3 MSc - Food Safety and Quality Engineering – Fall semester

3.1 Food Safety and Regulation*

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|---|-------------------|
| Course title: Food safety and regulation Subject code: ELTUD052N | Credits: 6 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „ Training character ”: lecture + practical (credit%) | |
| Course type: lecture course and practical course number of hours per semester: 39 (lecture) + 13 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 1st semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Gyula Kasza, PhD | |
| Teacher(s) involved in teaching of the subject: - | |

3.2 Separation Techniques*

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|--|-------------------|
| Course title: Separation Techniques Subject code: ELTUD075N | Credits: 5 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 39 (lecture) + 13 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 1st semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| Separation of mixtures into their components with energy investment. Mechanical methods: filtration, sieving, dialysis, chromatography, clarification, flotation, centrifugation. Thermal methods: distillation, crystallization, evaporation, drying, sublimation, lyophilization. Electrical methods: electrophoresis, electroosmosis, electro dialysis and electrostatic precipitation. Mass spectrometry is also included. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: | |
| Teacher(s) involved in teaching of the subject: | |

3.3 Advanced Consumer Sensory Methods*

| | |
|---|-------------------|
| Course title: Advanced Consumer Sensory Methods Subject code: ELTUD115N | Credits: 4 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + laboratory practice (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 13 (lecture) + 26 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: exam mark Other ways to be applied in evaluation: | |
| Place in training: 1st semester (autumn) | |
| Prerequisites: - | |
| Course Objectives: <hr/> | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Attila Gere, PhD | |
| Teacher(s) involved in teaching of the subject: - | |

3.4 Spectroscopic Analytical Methods*

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|---|-------------------|
| Course title: Spectroscopic Analytical Methods Subject code: ELTUD150N | Credits: 5 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „ Training character ”: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 39 (lecture) + 13 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 1st semester (fall) | |
| Prerequisites: | |
| Course Description: | |
| A field-specific chemistry course for the acquisition of basic food analytical skills and professional knowledge (spectroscopy, mass spectrometry). In addition to the theoretical knowledge of atomic and molecular spectroscopy, organic and inorganic mass spectrometry, students will also get to know the analytical applications of these analytical techniques in food analysis. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Zsuzsanna Jókai Szatura, PhD | |
| Teacher(s) involved in teaching of the subject: Péter Fodor, PhD | |

3.5 Physiological Relationships of Food Safety and Quality*

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|---|-------------------|
| Course title: Physiological Relationships of Food Safety and Quality Subject code: ELTUD054N | Credits: 6 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character” : lecture + practice (credit%) | |
| Course type : lecture course and lab course number of hours per semester: 39 (lecture) + 26 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: written exam Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| <p>The course provides an overview of the main risk factors that threaten food safety: natural toxins, contaminants and food processing toxicants. The quality and safety of apiculture products are also presented. Additional topics are allergens and bioactive compounds of food and their analytical detection methods. Genetically modified organisms, food adulterations and application of animal models in food nutrition and safety are also discussed. Food colloid systems, food additives, food supplements, nutraceuticals and functional foods are also an important part of the topics.</p> | |
| Required and recommended reading: Andrea T. Da Poian, Miguel A. R. B. Castanho (2021): Integrative Human Biochemistry. Springer, DOI 10.1007/978-1-4939-3058-6 Po Sing Leung (2014): The Gastrointestinal System. Gastrointestinal, Nutritional and Hepatobiliary Physiology. Springer, DOI 10.1007/978-94-017-8771-0 Kontogeorgis, G. M., Soren K., (2016): Introduction to Applied Colloid and Surface Chemistry. John Wiley & Sons Ltd. ISBN: 978-1-118-88118-7 S.T. Omaye (2004): Food and Nutritional Toxicology. CRC Press, ISBN 1-58716-071-4 | |
| Responsible instructor: Mariann Csóka, PhD | |
| Teacher(s) involved in teaching of the subject: Prof. Dr Livia Simon Sarkadi, DSc, full professor; Krisztina Takács, PhD; Anna Jánosi, PhD; András Nagy, PhD; Emőke Németh-Szerdahelyi, PhD; Rita Véghe, PhD; Rita Tömösközi-Farkas, PhD; | |

3.6 Analytical Classification of Foodstuffs 2*

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|---|-------------------|
| Course title: Analytical Classification of Foodstuffs 2 Subject code: ELTUD058N | Credits: 6 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) + 26 (laboratory practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: <i>familiar knowledge of instrumental analytical techniques and classical food analytical methods</i> | |
| Course Description: | |
| Course covers the ingredients, properties that determine the quality and chemical safety of food commodities (bakery products, fruit and vegetable, fish, alcoholic beverages, edible oil) and the relevant EU regulations and analytical product-specific test methods. Half of the course consists of instrumental analytical measurement practicals and a laboratory visit to develop competence in practical applications of food classification tasks. | |
| Required and recommended reading: Nielsen's Food Analysis, (or any textbook on food analytical methods) Understanding Codex – 5 th Edition (An introduction to Codex Alimentarius) Background info on EU chemical food safety policies (https://food.ec.europa.eu/food-safety/chemical-safety_en) | |
| Responsible instructor: László Abrankó, PhD | |
| Teacher(s) involved in teaching of the subject: Dr. Eszter, Benes, Dr. Judit Tormási, Dr. Zsuzsanna, Jókai-Szatura, Dr Csilla Sörös-Marczika, Dr. Rita-Tömösközi-Farkas | |

3.7 Plant and Process Design*

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|--|-------------------|
| Course title: Plant and Process Design Subject code: ELTUD191N | Credits: 4 |
| Nature of the course: compulsory optional course (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) + 26 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| <p>This course provides legal, technical, economic conditions, practical aspects and process of design, establishment and operation of a food processing plant. Planning process, energy flow of the plant, architectural and technical design documentation. Requirements for the design of the plant's surroundings and buildings. Material and personal circulation. Food plant construction, technical hygiene. Personal hygiene, labour, plant documentation, production sheet. Specific sectoral requirements for food processing plant. Ancillary facilities, warehouses, storage. Architectural solutions, energy aspects of plants. From concept to implementation. Project task: learning to use the SuperPro Design program, application in the preparation of the design task.</p> | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Mónika Máté, PhD | |
| Teacher(s) involved in teaching of the subject: Mónika Máté, PhD; Beatrix Szabó-Nótin, PhD; András Koris, PhD | |

3.8 Food Industry Management*

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|---|-------------------|
| Course title: Food Industry Management Subject code: GAZDT080N | Credits: 6 |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „ Training character ”: lecture + practical (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 39 (lecture) + 26 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: 3rd semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| Through food industry examples and case studies, students will become familiar with modern theories in strategic management, marketing management, innovation management, and project management. The main food development trends (such as functional, organic, etc.) are also part of the course. Additionally, the course covers business and project planning. The practical application of theoretical knowledge is realized in business and project planning, as well as in marketing research and its role in the development of new food products. Finally, the theoretical and practical foundations of communication and leadership skills will support the students' future careers. | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: Ágoston Temesi, PhD | |
| Teacher(s) involved in teaching of the subject: Ágoston Temesi, PhD | |

4 Available for both MSc and BSc program students

4.1 Advanced Food Physical Measurements

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|---|-------------------|
| Course title: Advanced Food Physical Measurement Subject code: ELTUD221N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: case reports, role play, thematic presentations | |
| Evaluation: presentation of measurements Other ways to be applied in evaluation: reports about the measurements | |
| Place in training: fall and spring | |
| Prerequisites: High school level of Physics | |
| Course description: Food technologies usually require the simultaneous knowledge of several physical quantities. Today, more and more instruments are emerging that can measure two or more physical quantities simultaneously. The course - without claiming to be exhaustive - describes these measurements and the basic measurements connected to them. Advanced structure testing methods, special light microscopes, atomic force microscope, electron microscope. Liquid density measurement by vibrating capillary method, density measurement of porous materials. Viscosity measurement, oscillation rheometer measurements. Spectroscopic methods, various methods of evaluating NIR spectra; measurement of thermal conductivity by instational methods. Determination of electrical conductivity and dielectric constant by impedance spectroscopy; Simultaneous measurement of different physical characteristics: rheological characteristics and dielectric characteristics; NIR spectrum and rheology characteristics; recording a Raman spectrum in different layers with a confocal microscope. Structure test methods: 1-2 weeks: special light microscopes, ultraviolet microscope, fluorescence microscope, polarizing microscope, confocal microscope; atomic force microscope; electron microscope 3 Week: Measurement of fluid density with a vibrating capillary 4 Week: Viscosity measurement with oscillation rheometer, determination of yield strength 5-6 weeks: infrared spectroscopy: Recording and evaluation of NIR (near infrared) spectra by different methods 7-8 weeks electrical property measurements 9 week measurement of thermal conductivity by instacioner method 10 week measurement of electrical properties under the influence of force 11 week Determination of rheological characteristics in electric field 12 weeks Recording of NIR spectrum under pressure 13 week Evaluation of reports | |
| Required and recommended reading: Grimnes S. Martinsen O.G. <i>Bioimpedance and bioelectricity, Basics</i> , Elsevier, 2015 ISBN: 978-0-12-411470-8 N Figura, L.O., Teixeira A.A.: <i>Food Physics</i> , Springer, 2007. Scientifical articles, tudományos cikkek | |
| Responsible instructor: Vozáry Eszter PhD. | |
| Teacher(s) involved in teaching of the subject: Dr. Kaszab Tímea PhD. | |

4.2 Biochemical properties of cereal- based products**

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|---|-------------------|
| Course title: Biochemical Properties of Cereal- based Products Subject code: ELTUD350N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge:- | |
| Evaluation: written exam Other ways to be applied in evaluation: Students will be given 5-6 articles, which they have to present as case study. | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: | |
| <p>Week 1. Overview of enzymatic processes during grain storage and processing</p> <p>Week 2. Amylolytic and proteolytic state of various cereals</p> <p>Week 3. The role of starch and amylase enzyme in grain and grist</p> <p>Week 4. Determination of yellow pigment content in cereals and pasta with different methods. Features of carotenoids.</p> <p>Week 5. Grouping and presenting characteristics of phenolic compounds. Determination of phenolic content in cereal and pasta grist.</p> <p>Week 6. Presenting the mechanism of peroxidase and lipoxygenase enzymes, their presence and impact on the production process of dry pasta.</p> <p>Week 7. Presenting the mechanism of polyphenol oxidase enzyme in plant cells. Monitoring the presence of active enzyme during dry pasta production process.</p> <p>Week 8. Presentation the chemical characteristics of special grains and flours.</p> <p>Week 9 Presentation of enzyme system in special cereal grains and grist.</p> <p>Week 10. Comparison of chemical and biochemical characteristics of special and traditional cereal grains and milling products</p> <p>Week 11. Effect chemical and biochemical characteristics of the final pasta product.</p> <p>Week 12. Presentation of special pasta products (bio products)</p> <p>Week 13. Presentation and discussion of the ongoing research activities at the department</p> | |
| Responsible instructor: Dr. Szedljak Ildikó, assistant professor, PhD | |

4.3 Cereals of the World**

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|--|-------------------|
| Course title: Cereals of the World Subject code: ELTUD382N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge:- | |
| Evaluation: 30% evaluation of the student’s presentation and 70% written exam Other ways to be applied in evaluation: Students have to write an essay about the production processes of a chosen cereal. Students have to present their essay for a scientific discussion at the end of the semester. | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: <hr style="border-top: 1px dashed #f0e68c;"/> Week 1. Introduction to the course. Wheat (cultivation, production data –area, yield, cost, nutritional value) Week 2. Wheat (food and non-food use, wheat-derived products) Week 3. Corn (cultivation, production data –area, yield, cost, nutritional value,) Week 4. Corn (food and non-food use, cord-derived products) Week 5. Rice (cultivation, production data –area, yield, cost, nutritional value,) Week 6. Rice (food and non-food use, rice-derived products) Week 7. Rye (cultivation, production data –area, yield, cost, nutritional value, food and nonfood use) Week 8. Oat (cultivation, production data –area, yield, cost, nutritional value, food and non-food use) Week 9. Millet and Sorghum (cultivation, production data –area, yield, cost, nutritional value, food and non-food use) Week 10. Barley (cultivation, production data –area, yield, cost, nutritional value, food and nonfood use) Week 11. Pseudocereals and less common cereals Week 12. Students’ presentation Week 13. written exam | |
| Required and recommended reading: <hr style="border-top: 1px dashed #f0e68c;"/> Presentors’s notes Karel Kulp: Handbook of Cereal Science and Technology, Second Edition, Revised and Expanded CRC Press, 2000, ISBN 9780824782948 Peter Belton: Pseudocereals and Less Common Cereals, Springer 2002. ISBN 9783540429395 | |
| Responsible instructor: Badakné dr. Kerti Katalin, egy. docens, PhD | |
| Teacher(s) involved in teaching of the subject: Badakné dr. Kerti Katalin, associate professor, PhD | |

4.4 Component Migration in Food**

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|---|-------------------|
| Course title: Component Migration in Food (ETEG004C) Subject code: ELTUD351N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character“: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: case reports, role play, thematic presentations | |
| Evaluation: 40% written exam at the end of semester, 30% homework, 30% team work Other ways to be applied in evaluation: Team work: case study of the migration control in a chosen food product – presentation given in team (case study) Individual homework: an essay with the comparative analysis of recent publications and its presentation to the group (case study) | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: <hr style="border-top: 1px dashed #f0e68c;"/> Week 1: Composite foods – definition, overview Week 2: Migration processes, their types, definition Week 3: Water migration Week 4: Vapour and gas migration Week 5: Oil migration Week 6: Barriers: definition, classification, applications Week 7: Protein based barriers Week 8: Carbohydrate barriers Week 9: Fat based barriers and composite barriers Week 10: Instrumental evaluations. Migration processes between food and its packaging Week 11: Case study I. (Comparison of existing hypotheses – presentation of the home work) Week 12: Case study II. (Presentation of the team work) Week 13: Written exam | |
| Required and recommended reading: <hr style="border-top: 1px dashed #f0e68c;"/> Presentors’s notes L.L. Katan: Migration from Food Contact Materials Springer Science & Business Media, 2012, ISBN 9781461312253 current publications in the subject | |
| Responsible instructor: Badakné dr. Kerti Katalin, associate professor, PhD | |
| Teacher(s) involved in teaching of the subject: Badakné dr. Kerti Katalin, associate professor, PhD | |

4.5 Dairy Technology

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|---|-------------------|
| Course title: Dairy Technology Subject Code: ELTUD232N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: written exam Other ways to be applied in evaluation: 10 min presentation during the semester about a dairy technology-related topic | |
| Place in training: fall and spring | |
| Course description: The aim of the subject is to gain knowledge of the process of milk production, handling and milk processing technologies. The students learn about the composition of milk, its nutritional value, micro-organisms in milk. Processing equipment are also discussed. The students practice and extend their knowledge of English terminology. | |
| Course schedule: Introduction. Milk production and consumption statistics. Composition of milk. Physical and chemical characteristics of milk. Microorganisms in milk, starter cultures. Milk grading. Primary production, collection and reception of milk. General milk handling technologies I. (clarification, skimming, homogenization General milk handling technologies II.(pasteurization, cooling). Manufacturing of fresh market milk. Fermented dairy products (yoghurt, kefir, sour-cream). Manufacturing of butter and butterfat. Ice cream manufacture Cheesemaking – acid coagulated cheese Cheesemaking – rennet coagulated cheese, Processed cheese. | |
| <i>Required and recommended reading:</i> | |
| Norman N. Potter: Food Science, 4th edition, Chapter 13.: Milk and Milk Products, 1986, Van Nostrand Reinhold, New York; Douglas Goff: Dairy Science and Technology Education, University of Guelph, Canada, www.foodsci.uoguelph.ca/dairyedu/home.html ; handouts (selected papers). | |
| Responsible instructor: Klára Pásztor-Huszár, Ph.D. | |

4.6 Food Additives*

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|---|-------------------|
| Course title: Food Additives Subject code: ELTUD213N | Credits: 4 |
| Nature of the course: optional course (C) (a limited number of ERASMUS students can be admitted) | |
| „Training character”: lecture + practical (credit%) | |
| Course type: lecture course and practical course number of hours per semester: 13 (lecture) + 13 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: sensory test | |
| Evaluation: exam Other ways to be applied in evaluation: | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: Requirements and of the Food Additives, (history, legislation, health effects) Groups, properties, sweeteners in the product development. Sweeteners in the product development Additives influencing the Organoleptic Properties Colorants. Colorants in the product development. Texture modifiers – emulsifiers, foaming agents, gelling agents, thickeners in the product development. Additives lengthening the storage life Preservatives, Antioxidants in the product development Natural preservatives Aromatic compounds Practice: Investigation of texture modifiers Comparison of natural and artificial sweeteners and colorants Product development | |
| <i>Required and recommended reading:</i> | |
| Regulation 1333/2008 EK Regulation 1129/2011 EK | |
| Responsible instructor: Lilla Szalóki-Dorkó, assistant professor, PhD | |
| Teacher(s) involved in teaching of the subject: Mónika Máté, associate professor, PhD | |

4.7 Food Packaging and Safety

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|---|-------------------|
| Course title: Food Packaging and Safety Subject code: ELTUD214N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: sensory tests | |
| Evaluation: exam Other ways to be applied in evaluation: - | |
| Place in training: fall | |
| Prerequisites: - | |
| Course description: Introduction to the Food Packaging Introduction to the Food Safety and Food Packaging Packaging solution in case of different product group Food Packaging Systems and Machines Food Packaging Systems New Ways in Plastic Food Packaging Materials Impact of Environmental Regulations on the Food Packaging, Design and Marketing Waste System Practice: Investigation of different food packaging | |
| Required and recommended reading: Brody, A.L. and Lord, J.B. (2000): Developing new Food Products for a Changing Marketplace, CRC Press, USA Han, J. H. (2005): Innovations in Food Packaging, Elsevier Academic Press, UK Lee, D. S. and Yam, K.L. (2008): Food Packaging, Science and Technology, CRC Press, London Moskowitz, H. Et al. (2009): Packaging Research in Food Product Design and Development, Wiley-Blackwell, Iowa Robertson, G. (1993): Food Packaging, Principle and Practice, Marcel Dekker, N.Y. | |
| Responsible instructor: Beatrix Szabó-Nótin, associate professor, PhD | |
| Teacher(s) involved in teaching of the subject: Julianna Kereszturi, assistant lecturer | |

4.8 Food Science and Gastronomy

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|---|-------------------|
| Course title: Food Science and Gastronomy Subject code: ELTUD201N | Credits: 2 |
| Nature of the course: optional course | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: Students will individually work out given case-studies Attendance is recommended but not mandatory. active participation is appreciated during lectures. | |
| Place in training: fall and spring semester | |
| Prerequisites: - | |
| Course Description: | |
| The aim of the course is to summarise basic gastronomic knowledge. The application of food preparation technologies (baking, cooking), the theoretical background, the detailed presentation of the working principles of each technology in practice. Possible applications of cooking technologies in the food industry. Introduction to food preparation methods adapted to new consumer requirements. The aim of the exercises is to familiarise students with the effects of the technologies used on food and their scientific background. To explain the technologies that can be applied to the main categories of ingredients. | |
| <i>Required and recommended reading:</i> - Larousse Gastronomique - Akadémia kiadó Konyhatudomány sorozata - Jean Anthelme Brillat-Savarin: Physiology of taste - Michel Maincent: La Cuisine de reference / Technologie Culinair - The Cambridge World History of Food 1-2 - The Oxford Companion to Food (Alan Davidson) - Hervé This – books, articles cookbooks, blogs, marketplaces and many more | |
| Responsible instructor: György Kenesei, PhD | |
| Teacher(s) involved in teaching of the subject: György Kenesei, PhD | |

4.9 I Living Lab - Wellbeing and Active Aging

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|--|------------|
| Course title: International project course in the topic of wellbeing and active aging. Subject code: ELTUD240N | Credits: 3 |
| Nature of the course: optional course (C) | |
| „ Training character ”: consultations (credit%) | |
| Course type: consultation course language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: Other ways to be applied in evaluation: | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: | |
| <p>In this project course, real-world problems, that are different in each year, are solved by group of international students from different European universities. The problem solving is helped by a teacher but only coaching the process. The goal of the course is to gain skills are directly connected to the demand of the industry like creativity, computational thinking and digital literacy, new media literacy, social intelligence, design mindset, novel and adaptive thinking, sense Making, (virtual) collaboration, cognitive load management, cooperation skills, future mindset. The goals are achieved in collaboration with fellow students, industrial, social, and governmental partners using the modern information technologies and data bases.</p> | |
| Responsible instructor: Adrienn Varga-Tóth PhD, research fellow, PhD | |

4.10 I Living Lab (general topic, not only Artificial Intelligence)*

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|---|-------------------|
| Course title: I Living Lab (– artificial intelligence) Subject code: ELTUD241N | Credits: 3 |
| Nature of the course: optional course (C) (a limited number of ERASMUS students can be admitted) | |
| „Training character“: laboratory practice (credit%) | |
| Course type: lab course number of hours per semester: 24 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: based on participation and activity Other ways to be applied in evaluation: project evaluation | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course Description: | |
| The course focuses on specific not exclusively AI related challenges,. Throughout the course, we will explore the conditions that influence these aspects and identify the needs and gaps present in real world situation. Based on these findings, we aim to develop a plan for practical solutions and tools, that could be implemented later in real life. The course provides an excellent opportunity to develop and practice skills in project management, design thinking, communication, international interdisciplinary teamwork, digital literacy, and product development. | |
| <i>Required and recommended reading:</i> several handsouts and videos during the course | |
| Responsible instructor: Zoltán Gillay , PhD | |
| Teacher(s) involved in teaching of the subject: Biborka Gillay, Phd, or others | |

4.11 Introduction to Cereal based Technologies

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|---|-------------------|
| Course title: Introduction to Cereal based Technologies Subject code: ELTUD357N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge:- | |
| Evaluation: 30% evaluation of the student’s presentation and 70% written exam Other ways to be applied in evaluation: Students have to write an essay about the production processes of a chosen cereal based product (for example a „national” bakery product like pita, bagel ..etc). Students have to present their essay for a scientific discussion at the end of the semester. | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: <hr style="border-top: 1px dashed #f0e68c;"/> Week 1. Cultivation of the main cereals I. Wheat, triticale, barley etc. Week 2. Cultivation of the main cereals II. Rice, corn, millet Week 3. Sugar processing. Cultivation of sugar beet and sugar cane. Week 4. Sugar processing. From plant to sugar products. Week 5. Milling technologies. From wheat to wheat flour. Week 6. Milling technologies. Milling of rice, corn. Week 7. Oil plants(cultivation) Week 8. Oil production for cereal based products Week 9. Baking technologies I. (bread) Week 10. Baking technologies II. (bakery products) Week 11. Baked confectionary products. Production of snack foods Week 12. Pasta technologies (dried and fresh pasta) Week 13. Students’ presentation | |
| Responsible instructor: Badakné dr. Kerti Katalin, associate professor, PhD | |
| Teacher(s) involved in teaching of the subject: Badakné dr. Kerti Katalin, egy. docens, PhD Kóczán Györgyné, egy. adjunktus, PhD Dr. Szedljk Ildikó, egy. adjunktus, PhD Molnárné Jakab Ivett, egy.tanárségéd | |

4.12 Introduction to Cloud-based AI Computing for Engineers*

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|---|-------------------|
| Course title: Introduction to cloud-based AI computing for engineers Subject code: ELTUD418N | Credits: 4 |
| Nature of the course: optional course (C) (a limited number of ERASMUS students can be admitted) | |
| „Training character“: lecture + practical (credit%) | |
| Course type: lecture course and self paced learning and project work number of hours per semester: 4 (lecture) + 24 (practice) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: project evaluation or exam Other ways to be applied in evaluation: | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course Description: | |
| <p>For students that are interested in gaining experience working with cloud-based technologies, learning Microsoft Azure can be a valuable addition to their skill set. As the use of cloud computing continues to grow in popularity, having experience with platforms like Azure can enhance their career prospects and make them a more attractive candidate in the job market.</p> <p>The primary objective of the course is to provide students with fundamental knowledge of cloud-based computing using Microsoft Azure. During the lectures, students will learn about the distinctions between on-premises and online databases and computing environments, as well as the availability of cloud-based data analysis tools, which include artificial intelligence-related software. Students will be given free access to use Azure during and after completing the course.</p> <p>The course helps with obtaining official, globally acknowledged Microsoft certifications, although acquiring any certification it is NOT a requirement to successfully complete the subject.</p> | |
| Required and recommended reading: https://learn.microsoft.com/en-us/training/browse/?products=azure | |
| Responsible instructor: Zoltán Gillay , PhD | |
| Teacher(s) involved in teaching of the subject: Matyas Lukacs, operative lecturer | |

4.13 Meat and Poultry Technology and Quality Issues

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|---|-------------------|
| Course title: Meat and Poultry Technology and Quality Issues Subject code: ELTUD216N | Credits: 2 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: written exam Other ways to be applied in evaluation: Students will prepare a ppt. form presentation about individual topics regarding the subject during the semester. | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: | |
| <p>The purpose of the C-type subject is to provide knowledge about the treatments and processing technologies of livestock products such as meat, poultry and egg products. The course covers the knowledge of raw materials, raw material composition, its physical and chemical properties, hygiene and technical aspects regarding to the subject, and the technology-processing steps and parameters. Students meet certain technological processes during practice classes.</p> <ol style="list-style-type: none"> 1. The importance and tendencies of meat production. The composition of the meat, its physical, chemical and biochemical properties and nutritional value. Meat defects. 2. Effects of conditions before slaughtering (animal husbandry, transport, temporary accommodation) on the cutting value. Slaughtering technology, structure of the slaughtering lines, steps of the slaughtering. The technological steps of the dirty areas of swine slaughtering, its machines and equipment. 3. The technological steps of the clean areas of swine slaughtering, its machines and equipment. 4. Processes of cattle slaughtering. Objective meat grading in the slaughterhouse. 5. Poultry slaughtering technology. Hygiene of slaughtering. 6. The cutting and boning technology and equipment. 7. The cooling, freezing and storage of meat. The impact of storage on meat quality changes. 8. The composition, structure and properties of chicken eggs. The technological steps of egg processing. 9. Examination of the effect of determining technological parameters on the quality of meat mass, stuffed meat products. Theoretical and practical aspects of heat-treated stuffed meat production technology. 10. Parameters affecting the quality of meat mass (in practice) 11. Meat cuts products: cutted, cured products, principles of curing and technological solutions. Raw material preparation, curing, technological solutions for reducing water activity. 12. Cutted and shredded cured cooked products processing technology, heat treatment, machines and equipment. 13. The fermented meat products (dry goods) grouping, processing technology, theoretical background, machines and equipment. 14. Packaging methods of meat and meat products, machines and equipment. | |
| <i>Required and recommended reading:</i> | |
| Materials, handouts supplied by the course leader R. A. Lawrie, D. A. Ledward (2006): Lawrie's meat science. CRC Press | |
| Responsible instructor: Adrienn Varga-Tóth PhD, research fellow | |
| Teacher(s) involved in teaching of the subject: László Friedrich PhD., professor, József Surányi, | |

4.14 Minimal Processing in Food Preservation Technologies

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| Course title: Minimal Processing in Food Preservation Technologies Subject code: ELTUD220N | Credits:4 |
| Nature of the course: optional course (C) | |
| „Training character”: theory (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: written exam Other ways to be applied in evaluation: Students will prepare a ppt. form presentation about individual topics regarding the subject during the semester. | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description | |
| <p>The purpose of the C-type subject is to provide knowledge about the theoretical background of minimal processing technologies of food, a detailed description of the operating principle of the technologies. Food applications of the technologies and its achievements so far, investigation of their possible future potential. The new consumer expectations and their encounter with the minimal processing technologies. Provide knowledge about the effects of the technologies on food products by practice class.</p> <ol style="list-style-type: none"> 1. The new types of consumer and expectations. Introduction of minimal food processing technologies, their principles, advantages and possibilities. 2. Principle of Modified Atmosphere Packaging technology 3. General aspects of „Pressure technologies” 4. Introducing the sous-vide technology 5. Application of pulsed electric field in food industry 6. Application of ultrasound technology in food industry 7. Principles, history and future potential of the high hydrostatic pressure treatment 8. Irradiation preservation of foods 9. Introducing of UV light , Pulsed light 10. Edible coating and ripening control 11. Role of bioactive compounds and essential oils in food preservation 12. The evaluation of individual presentations and mid-term tasks. 13. Written exam | |
| Required and recommended reading: | |
| Handouts supplied by the course leader Ohlsson T. and Bengtsson N. (2002): Minimal Processing Technologies in the Food Industries. Woodhead Publishing Limited. Shafiur Rahman, M.S., Siddiqui, M.W., (2015): Minimally Processed Foods, Technologies for Safety, Quality, and Convenience 10.1007/978-3-319-10677-9. | |
| Responsible instructor: István Dalmadi PhD., associate professor | |
| Teacher(s) involved in teaching of the subject: Klára Pásztor-Huszár, PhD, György Kenesei PhD, Adrienn Varga-Tóth PhD, Tamás Zsom PhD, Gábor Jónás PhD., Khabat Noori Hussein PhD | |

4.15 Physical Properties of Food

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| Course title: Physical Properties of Foods Subject code: ELTUD209N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: case reports, role play, thematic presentations | |
| Evaluation: presentation of measurements Other ways to be applied in evaluation: reports about the measurements | |
| Place in training: fall and spring | |
| Prerequisites: high school level of physics | |
| Course description: | |
| presentation of physical properties used in food processing and in quality safety of foods; presentation of physical methods applied in research work at Physics and Control Department: measurement of geometrical (volume, shape) properties, mechanical properties (elasticity, viscosity), measurement of thermal properties (thermal conductivity, specific heat capacity), electrical properties (permittivity, conductivity), and colour of foods. 1. week: Mechanical properties (size, shape, density, porosity) measurement of density 2. week: Basic rheological methods (force and deformation, mechanical histeresis, elasiticity, viscosity) 3. week: Viscosity of solution and pulps, measurement with rotation viscosity meter 4. week: Thermal properties of foods (thermal conductivity and heat capacity) 5. week: Measurement of thermal conductivity of vegetables and fruits 6. week: Measurement of thermal conductivity of solutions 7-8. week: Electrical impedance 9. week: Electrical impedance spectra of vegetables, fruits and foods 10. week: Model circuit discribing the impedance spectra. 11. week: Electrical permittivity measurement. determination of moisture content of foods 12. hét: Optical properties 13. hét: Measurement of NIR spectrum of food | |
| Required and recommended reading: | |
| Rao M.A., Rizvi S.S.H.: Engineering Properties of Foods, Marcel Dekker Inc.1995. Figura, L.O., Teixeira A.A. Food Physics, Springer, 2007. Grimnes S. Martinsen O.G. <i>Bioimpedance and bioelectricity, Basics</i> , Elsevier, 2015 ISBN: 978-0-12-411470-8 N Scientifical articles, tudományos cikkek | |
| Responsible instructor: Dr. Kaszab Tímea PhD | |
| Teacher(s) involved in teaching of the subject: Dr. Vozáry Eszter | |

4.16 Sensory Analysis I.

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| Course title: Sensory Analysis I. Subject code: ELTUD224N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: sensory tests | |
| Evaluation: written test at the end of the semester Other ways to be applied in evaluation: students prepare a short presentation on the basis of a chosen article | |
| Place in training: fall and spring | |
| Prerequisites: - | |
| Course description: The course gives an overview on the field of sensory analysis. The participant will learn the major types of sensory test methods and the principles of assessor's evaluation, according to the following major areas: The initiation and the development of sensory science; Panelist screening tests, color recognition test; Overview of the relevant ISO sensory standards; Physiological basis of sensory evaluation; Frequent faults in sensory tests; Odor recognition tests; Difference tests ; Ranking tests; Descriptive tests; Product sepcific odor tests | |
| Required and recommended reading: | |
| Compulsory: Kókai, Z. (2006) Sensory Analysis I-II., Corvinus University of Budapest – provided in pdf format for the students Recommended: Stone, H., Bleibaum, R. N., Thomas, H. A. (2014) Sensory Evaluation Practices (Fourth Edition), Academic Press, London, http://www.sciencedirect.com/science/book/9780123820860 | |
| Responsible instructor: Kókai Zoltán, egyetemi docens, PhD | |
| Teacher(s) involved in teaching of the subject: | |

4.17 Sensory analysis II.

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| Course title: Sensory Analysis II. Subject code: ELTUD225N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character“: lecture and practice 50 (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: sensory tests | |
| Evaluation: written test at the end of the semester Other ways to be applied in evaluation: students prepare a short presentation on the basis of a chosen article | |
| Place in training: each fall and spring | |
| Prerequisites: - | |
| Course description: | |
| The course gives an insight into the application of sensory methods. During the semester the participants will learn several statistical procedures for analyzing sensory data. The following topics will be discussed in details: The role of sensory evaluation in quality control; Relationship of electronic and human senses, principles of the human senses; Monitoring of sensory quality, IT support of sensory tests; Setting up a sensory panel; Statistical evaluation of ranking tests; Friedman test and Page test; ANOVA and pairwise significant differences; Pairwise ranking – modified Friedman analysis. Cluster analysis; How to design a sensory test. The use of human senses as instruments; The effect of brand on sensory perception; Panel performance monitoring methods; Consumer tests and the practical application of preference mapping | |
| Required and recommended reading: | |
| Compulsory: Kókai, Z. (2006) Sensory Analysis I-II., Corvinus University of Budapest – provided in pdf format for the students Recommended: Stone, H., Bleibaum, R. N., Thomas, H. A. (2014) Sensory Evaluation Practices (Fourth Edition), Academic Press, London, http://www.sciencedirect.com/science/book/9780123820860 | |
| Responsible instructor: Kókai Zoltán, full professor, PhD | |
| Teacher(s) involved in teaching of the subject: | |

4.18 Basics of Brewing Technology

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| Course title: Basics of Brewing Technology Subject code: ELTUD197N | Credits: 4 |
| Nature of the course: optional course (C) | |
| „Training character“: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: written exam Other ways to be applied in evaluation: individual assignment (essay) | |
| Place in training: fall and spring semester | |
| Prerequisites: - | |
| Course Description: | |
| Basic knowledge of raw materials and technologies of malting, brewing and fermentation. Introduction to the English terminology of brewing. Beer types. Regulations. Raw materials of brewing (water, malt, hops, yeast). Malt production (Intake of barley and equipment. Biochemical processes, technology and equipment of steeping, germination and kilning.) Wort production (Malt milling. Biochemical process and technology of mashing. Wort separation. Chemical and physical processes of wort boiling.) Beer production (Cooling and clarifying wort. Brewer’s yeast: metabolism. Yeast management. Changes during fermentation and maturation. Equipment and technology of fermentation.) Beer filtration and clarification. Filling Production of special beer types (alcohol-free, gluten-free) Nutritional aspects of beer | |
| Recommended reading: Wolfgang Kunze: Technology brewing and malting, International edition, VLB, Berlin, 2 nd revised edition, 1999 (or newer) Dennis E. Briggs, Chris A. Boulton, Peter A. Brookes, Roger Stevens: Brewing: Science and Practice, CRC Press, Boca Raton, Fl., 2004 Hans Michael Eßlinger (ed.): Handbook of Brewing. Wiley-WCH, Weinheim, 2009 | |
| Responsible instructor: Gabriella Kun-Farkas, PhD | |
| Teacher(s) involved in teaching of the subject: Gabriella Kun-Farkas, PhD | |

4.19 Nutritional Biochemistry

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| Course title: Nutritional Biochemistry Subject code: ELTUD198N | Credits: 2 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course and lab course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: test on technical terms, exam mark: exam Other ways to be applied in evaluation: | |
| Place in training: fall and spring semester | |
| Prerequisites: - | |
| Course Description: | |
| Purpose of the subject: To show how the various ingredients found in food can affect human metabolism, and how the symptoms of people with a sluggish metabolism can be alleviated with proper nutrition. Transfer of biochemical aspects that serve the production and consumption of healthy foods. Biochemical aspects of nutrition of special diets. Biochemical aspects of harmful passions and self-destructive lifestyles and their relationship with dietary habits. In the case of BSc students, the condition for admission to the subject is a successful organic and biochemistry or biochemistry exam. | |
| Required and recommended reading: <ol style="list-style-type: none"> 1. Bender, D.A.: Nutritional biochemistry of the vitamins. Cambridge University Press Cambridge New York Port Chester Melbourne Sydney 1992. 2. Luckner, M.: Secondary metabolism in microorganisms, plants and animals. Springer-Verlag Berlin Heidelberg New York London Paris Tokyo Hong Kong 1990. 3. Stryer, L.: Biochemistry (3rd Edition) W.H. Freeman & Company New York 1988. 4. Crozier, A., N. Clifford, M.N., Ashihara, H.: Plant Secondary Metabolites. Blackwell Publishing Oxford 2006 | |
| Responsible instructor: Judit Kosáry, PhD | |
| Teacher(s) involved in teaching of the subject: Judit Kosáry, PhD | |

4.20 Knowledge of Preservation Technologies 1**

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| Course title: Knowledge of Preservation Technologies 1 | Credits: 3 |
| Subject code: ELTUD173N | |
| Nature of the course: obligatory course (a limited number of ERASMUS students can be admitted) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 26 (lecture) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: 30% evaluation of the student’s presentation and 70% written exam Other ways to be applied in evaluation: | |
| Place in training: 5th semester (fall) | |
| Prerequisites: - | |
| Course Description: | |
| <p>The topics under discussion are concerned with the processes of heat removing preservation technologies. At the beginning of the semester, students are provided with an overview of cooling technologies, covering the fields of postharvest activities, different cold storage methods and the characteristics of consumer-packaged chilled products. Majority of the semester is dedicated to the complete study of food freezing technologies.</p> <ul style="list-style-type: none"> • Week 1: General aspects of food cooling • Week 2: Cold treatment of vegetables and fruits • Week 3: Cold treatment of livestock and dairy products, RTE meals • Week 4: Basic aspects of food freezing 1. • Week 5: Basic aspects of food freezing 2. • Week 6: Food freezing methods • Week 7: Stability of frozen food • Week 8: Cold chain • Week 9: Students’ presentation of individual topics • Week 10: Production of frozen vegetables • Week 11: Production of frozen fruits • Week 12: Production of frozen pasta and ice cream • Week 13: Written exam | |
| <i>Required and recommended reading:</i> | |
| Responsible instructor: István Dalmadi, PhD | |
| Teacher(s) involved in teaching of the subject: István Dalmadi, PhD; Tamás Zsom, PhD | |

4.21 Food Safety and Soil Health

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| Course title: Food Safety and the Soil Health Subject code: ELTUD441N | Credits: 3 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 18 (lectures) + 8 (laboratory visits) language: English Other ways and characteristic to be applied in transferring of the given knowledge: sensory tests | |
| Evaluation: exam Other ways to be applied in evaluation: case studies, project teamwork, student presentation | |
| Place in training: fall | |
| Prerequisites: - | |

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| Course description: |
| <p>Life on Earth depends on healthy soil — a living ecosystem that sustains plants, animals, and humans. This course explores the crucial role of soil in food safety and public health, emphasizing its biological complexity and the microbial interactions that underpin the soil–food web. Students will learn about microbiological testing methods, sampling techniques, and the regulatory framework that ensures food safety from farm to table. The course also highlights emerging technologies and sustainability initiatives related to soil and food microbiology.</p> <p>Topics include:</p> <ul style="list-style-type: none"> • EU Mission for Soil Health and Food • The Soil–Food Web • Microbe-based technologies in the European Green Deal • GMO vs. Organic systems • Foodborne pathogens, spoilage, and contamination • Food hygiene, cleaning, and disinfection • Detection of food allergens <p>A study visit to a biotechnology laboratory provides hands-on experience with microbial testing and industrial practices.</p> |
| Required and recommended reading: |
| <p>Rober W. Bauman (szerk.): Microbiology, International Edition, Pearson PLC.San Fancisco, 2004. ISBN: 0-8053-7656-9</p> <p>European Commission report: Caring for soil is caring for life, Ensure 75% of soils are healthy by 2030 for food, people, nature and climate, ISBN 978-92-76-21602-5, doi: 10.2777/821504</p> <p>European Commission, EU Soil Strategy for 2030, https://ec.europa.eu/environment/publications/eu-soil-strategy-2030_en</p> |

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| Responsible instructor: Tamás Kocsis, PhD |
| Teacher(s) involved in teaching of the subject: |

4.22 Ice-cream technology

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| Course title: Ice-cream technology Subject code: ELTUD437N | Credits: 2 |
| Nature of the course: optional course (C) | |
| „ Training character ”: lecture (credit%) | |
| Course type: lecture course number of hours per semester: 13 (lectures) + 13 (laboratory visits) language: English Other ways and characteristic to be applied in transferring of the given knowledge: - | |
| Evaluation: practical exam Other ways to be applied in evaluation: make an own ice-cream and presentation the results | |
| Place in training: spring and fall | |
| Prerequisites: - | |
| Course description: The aim of the course is to provide theoretical and practical knowledge of ice cream and ice-cream production technology. The course starts with knowledge of raw materials, followed by specific production technology, its steps and the scientific methodology related to the technology. During the semester, product qualification, storage and hygiene are also covered. Production technology and qualifications will be taught in theory and practical. | |
| Required and recommended reading: | |
| 1. CLARKE, C. (2012) The Science of Ice Cream, 2nd Edition, Royal Society of Chemistry, UK, 2. https://www.dreamscoops.com/ice-cream-science/ | |
| Responsible instructor: Nyulasné dr. Zeke Ildikó Csilla, PhD | |
| Teacher(s) involved in teaching of the subject: Dr. Hidas Karina, PhD | |