SZENT ISTVÁN UNIVERSITY
BUDAPEST
FACULTY OF FOOD SCIENCE

COURSE DATASHEET OF SUBJECTS AVAILABLE FOR ERASMUS STUDENTS AT THE FACULTY OF FOOD SCIENCE SPRING SEMESTER 2020/21

Content

BASICS OF BREWING TECHNOLOGY

Course code: ETSO008C
Course name: Basics of brewing technology
Number of hours per semester: 28
Credits: 4
Fall/Spring: Fall/Spring
Language: English
Prerequisites: None

Course type: bachelor and master
Department: Sör-és Szeszipari Tanszék (Department of Brewing and Distilling)
Course leader: Gabriella Kun-Farkas, assistant professor

Description of the subject:

1. week Introduction to the English terminology of brewing. History of brewing. Beer types.
2. week Raw materials of brewing.
3. week Malting I. Intake of barley and malt, and equipment. Biochemical processes, technology and equipment of steeping.
4. week Malting II. Biochemical processes, technology and equipment of germination and kilning. Malt evaluation.
5. week Wort production I. Malt milling. Biochemical process and technology of mashing.
6. week Wort production II. Wort separation.
7. week Wort production III. Chemical and physical processes of wort boiling.
8. week. Beer production I. Cooling and clarifying wort.
9. week Beer production II. Brewer's yeast: metabolism.
10. week Beer production III. Yeast management.
11. week Beer production IV. Changes during fermentation and maturation
12. week Beer production V. Equipment and technology of fermentation.
13. week Beer filtration and clarification. Filling
14. week Finished beer evaluation
15. week Written examination

Readings:

Wolfgang Kunze: Technology brewing and malting, International edition, VLB, Berlin, 2nd 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 Eβlinger (ed.): Handbook of Brewing. Wiley-WCH, Weinheim, 2009

Competencies: basic knowledge of raw materials and technologies of malting, brewing and fermentation

BIOCHEMISTRY

Course code: ETAK903C

Course name: Biochemistry

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall/Spring

Language: English

Prerequisites: Fluency in English, completed courses and exams in General and Inorganic Chemistry; Organic Chemistry and Biochemistry are compulsory.

Course type: Bachelor+Master

Department: Department of Applied Chemistry

Course leader: Judit Kosáry professor emerita

Aims, objectives and description of the course:
The lecture gives an advanced knowledge of food and nutritional biochemistry preparing the students to study microbiology, genetics and biotechnology.

Course schedule: the role of basic rules of living organisms (bioaffinity, biocatalysis, bioregulation) in food and nutritional biochemistry; the role of different biomolecules (proteins, nucleic acids, carbohydrates, lipids) in foods and the living organisms; enzymes; the metabolism of biomolecules (catabolism, anabolism); generation and storage of metabolic energy; membrane transports. For more information see the homepage of Judit Kosáry professor emerita: (https://jkosary.wordpress.com/).

Assessment, grading: On the basis of the written examination at the end of the exam period.

Competencies: understanding the relationships between biochemical processes in nutrition

Course/professor/lecturer: Judit Kosáry professor emerita

COMPONENT MIGRATION IN FOOD

Course code: ETEG004C
Course name : Component migration in food
Number of hours per semester: 28
Credits: 4
Fall/Spring: fall and spring
Language: English
Prerequisites: Basics in food technology
Course type: Bachelor and Master
Department: Gabona- és Iparinövény Technológiai Tanszék (Department of Cereal Technology)
Course leader: Badakné Dr. Kerti Katalin, associate professor, Head of the department

Course description: Students get to know those cases in the food industry, where a product is composed of many components –sometimes even components of different physical state. They will learn the driving forces in migration processes, its positive and negative effects. Through individual home work and team work they will improve their problem solving talent.

Course requirements during the semester: One homework and one team work exercise
Examination requirements: Written exam
Assessment, grading: 40% written exam 30 % homework 30% team work
Aims, objectives and description of the course: 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
Week 11: Migration processes between food and its packaging
Week 12: Case study I. (Comparison of existing hypotheses – presentation of the home work)
Week 13: Case study II. (Presentation of the team work)
Week 14: Written exam
Assignments: Team work: case study of the migration control in a chosen food product
Individual homework: an essay with the comparative analysis of recent publications

Recommended readings: Electronic material issued by the Department

DAIRY TECHNOLOGY

Course code: ETHAT902C
Course name : Dairy technology
Course name (Hungarian): Tejipari technológia
Number of hours per semester: 28
Credits: 4
Fall/Spring: Fall+Spring
Language: English
Prerequisites: basic knowledge about general food technologies; intermediate English skills

Course type: bachelor+master+PhD
Department: Hűtő- és Állatitermék Technológiai Tanszék (Department of Refrigeration and Livestock Products Technology)
Course leader: Pásztorné Dr. Huszár Klára, associate professor (Klára Pásztor Huszár, Ph.D.)

Course requirements during the semester: One presentation about a chosen topic related to dairy science and technology

Examination requirements: written exam at the end of the semester.

Assessment, grading: Test: 60%
Project preparation: 20%
Class participation: 20%

Aims, objectives and description of the course: 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: Composition, physical and chemical characteristics of raw milk. Milk grading system. Microorganisms in milk, starter cultures. Milk production, general milk-handling technologies (clarification, skimming, homogenization, pasteurization, cooling). Processing technologies of fresh and long-life market milk and fermented dairy products (yoghurt, kefir, sour-cream). Manufacturing of butter and butterfat and cheese. Processed cheese production and ice-cream manufacture.

Learning outcomes: The students acquire knowledge about milk production, milk processing technologies and their equipment. The students practice and extend their knowledge of English terminology.
Assignments: One presentation about a chosen topic related to dairy science and technology

Readings:
Compulsory readings:
- 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).

ECONOMICS AND MARKETING IN THE FOOD INDUSTRY

Course code: ETEMNEG01AMSA

Course name: Economics and marketing in the food industry

Course name (Hungarian): Közgazdaságtan és marketing az élelmiszeriparban

Number of hours per semester: 28

Credits: 3

Fall/Spring: Fall

Language: English

Prerequisites: Bachelor degree

Course type: master

Department: Élelmiszerlánc-management Tanszék (Department of Food Chain Management)

Course leader: Dr. Ágoston Temesi

Course schedule:
Basic knowledge about marketing (what is marketing?, STP marketing, theory of market evolution, Fishbein model, Consumer Involvement Theory, FCB matrix)
Basic knowledge about marketing (product, brand, communication)
Qualitative marketing research tools
Basics of innovation
Strategic management
Quantitative marketing research tools; Experimental auction
New food product development
Economics and marketing of functional foods
Introducing student innovation projects I.
Professional innovation project planning;
Resource allocation as base of innovation;
Patent database analysis
Intellectual properties
Economics and marketing of organic food products, Food consumer behaviour, Types of customer decisions
Introducing student innovation projects II.
Program's name: Food Science Engineer Master Program

Readings:

Kotler, P., & Keller, K. (2003). Marketing Management, (international version).
Jaeger, S. R., MacFie, H. (Eds.). (2010). Consumer-driven innovation in food and personal care products. Elsevier.
Meredith, J. R., Mantel, S. J. (2011). Project management: a managerial approach. John Wiley & Sons.

Course/professor/lecturer: Dr. Temesi Ágoston
Course code: ETEMNEG01AMSA

FOOD ADDITIVES

Course code: ETKT002C

Course name: Food additives

Course name (Hungarian): Élelmiszer-adalékanyagok

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall+Spring

Language: English

Prerequisites: Organic chemistry, Food chemistry, Basics of food technology

Course type: bachelor+master

Department: Konzervtechnológiai Tanszék (Department of Food Preservation)

Course leader: Stégerné Máté Mónika

Aims, objectives and description of the course:
Food safety, quality control, production technology aspects of utilization food additives. Role of food additives in product development, in organoleptic, physical properties and shelf life/storability of food products. Efficiency dependence of concentration, food product properties, technological parameters.
Legislation, regulation and control of utilization in food products.

Course requirements during the semester:
Lectures about theoretical knowledge of food additives
Student's presentations about certain practical, technological of legislative aspects of food additives

Readings:
Compulsory readings:
C. Fisher, T. R. Scott: Food flavours. The Royal Society of Chemistry, Cambridge, 1997.
R. J. Alexander: Sweeteners: Nutritive, Eagan Press, Minnesota (USA), 1998.
G. Linden, D. Lorient: New ingredients in food processing. Wodhead Publishing Limited, Cambridge, 1999.

Examination requirements: written exam at the end of semester

Course professor/lecturer: Stégerné Máté Mónika, Székely Dóra, Szabó-Nótin Beatrix

INTRODUCTION TO CEREAL BASED TECHNOLOGIES

Course code: ETGI005C

Course name : Introduction to cereal based technologies

Number of hours per semester: 28

Credits: 4

Fall/Spring: fall+spring

Language: English

Prerequisites: None

Course type: Bachelor and Master

Department: Gabona- és Iparinövény Technológiai Tanszék (Department of Cereal Technology)

Course leader: Badakné Dr. Kerti Katalin, associate professor, head of the department

Course description: The students of this course will get to know about the challenges, various methods and technical issues of the cereal based products' manufacturing processes. Topics cover the full cycle of production: from the cultivation of grains through preparation of semi-finished products (inc. milling technologies) to the quality assessment and classification of final products.

Course requirements during the semester: Written and oral presentation of a chosen subject

Examination requirements: Written exam

Assessment, grading: 30% evaluation of the presentation and 70% written exam

Learning outcomes: Students will know the basics of the cultivation of grains.
They will be able to judge the quality of the raw materials and will be able to classify them according their suitability for food products. They will know the basic production processes of different products based on cereals (from baked products to pasta).

Assignments: An essay has to be written 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.

Program's name: ERASMUS course in foreign language

MASS AND ENERGY TRANSFER PROCESSES

The code of the subject: ETEMNEM01AMSA

The name of the subject in English: Mass and Energy Transfer Processes - Transport Phenomena

Number of hours per semester: 28

Credits: 4

Semester: Fall

The language of teaching: English

Prerequisits: -

Type of the subject: Master

Name of the department: Élelmiszeripari Műveletek és Gépek Tanszék (Department of Food Engineering)

Course leader: Prof. Gyula VATAI, Head of the Department.

Short description of the topics:

Transport Phenomena in Foodstuffs: determination of state, changes of the state, systems (homogeneous, inhomogeneous, heterogeneous). Mathematical modeling of steady state transport. Mathematical modeling of transport processes changing in space and time. Chilton-Colburn analogy of momentum, heat and mass transfer processes. Unsteady state heat and mass transfer. Batch processes: distillation, drying. Absorption, adsorption.
Exercises: Design and calculation of batch and continuous processes. Mass- and energy-balance calculations for biological systems with and without reaction; Applying stoichiometric principles for macroscopic analysis of cell growth and product formation; Determining heats of reaction for aerobic and anaerobic cell cultures; Using heat capacity and steam tables, calculating latent and sensible heat changes, heats of mixing, etc.

Requirements: 2 written exams, including calculation examples.

Assessment: written exam

Evaluation method: On the basis of written exams (60 %) and oral exam (40 %)

Literature:
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.
P. M. Doran, Bioprocess Engineering Principles, Academic Press, The Netherlands, 2006

Teacher of the subject: Prof. Gyula VATAI, Assoc. Prof. Zoltan KOVACS

MINIMAL PROCESSING IN FOOD PRESERVATION TECHNOLOGIES

Course code: ETEMNHA13CB

Course name : Minimal processing in food preservation technologies

Number of hours per semester: 28

Credits: 4

Fall/Spring: fall+spring

Language: English

Prerequisites: General Food Technology (Basics of Raw Materials)

Course type: Bachelor and Master

Department: Hűtő- és Állatitermék Technológiai Tanszék (Department of Refrigeration and Livestock Products Technology)

Course leader: Dr. István DALMADI associate professor

Course description: 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.

Teaching and learning methods: The visiting of lectures is recommended, but not obligatory. The visiting of practice class is obligatory and to prepare a report of the results is a must. Students will prepare a ppt. form presentation about individual topics regarding the subject during the semester.

Reading: Materials supplied by the course leader.

Da-Wen Sun (ed.) (2005):Emerging Technologies for Food Processing, Elsevier Academic Press

G. V. Barbosa-Canovas, M. S. Tapia, M. P. Cano (2005): Novel Food Processing Technologies, Marcel Decker

Assessment: 60% written exam, 20-20% results of the practice class report and the individual presentation.

NUTRITIONAL BIOCHEMISTRY OF VITAMINS AND SECONDARY METABOLITES

Course code: ETAK901C

Course name: Nutritional Biochemistry of Vitamins and secondary Metabolites

Course name (Hungarian): A vitaminok és másodlagos anyagcseretermékek biokémiája

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall

Language: English

Prerequisites: Fluency in English, completed courses and exams in General and Inorganic Chemistry; Organic Chemistry and Biochemistry are compulsory.

Course type: Bachelor+Master

Department: Alkalmazott Kémia Tanszék (Department of Applied Chemistry)

Course leader: Judit Kosáry professor emerita

Aims, objectives and description of the course:
The lecture gives an advanced knowledge of the definition and nomenclature of vitamins. Their nutritional status and non-nutritional uses and the role of secondary metabolites in nutrition and in the living organisms.

Course schedule: Precursors of reagents for biochemical reactions – water-soluble vitamins: a) precursors of coenzymes of oxidoreductases: niacin, riboflavin, ascorbic acid; b) precursors of coenzymes of transferases: biotin, folic acid, cyanocobalamin, thiamin, pantothenic acid, pyridoxine; c) compounds of doubtful vitamin status: taurine, carnitine, choline, inositol. Vitamins of other functions – vitamin lipids: retinol and ß-carotene, cholecalciferol and its vitamers, tocopherols, phylloquinone and its vitamers. Definition and types of secondary metabolites. Secondary metabolites used in food industry (e.g. flavour agents of spices, pigments, antioxidants, alkaloides, etc.). For more informations see the homepage of Judit Kosáry professor emerita: (https://jkosary.wordpress.com/).

Assessment, grading: On the basis of the written examination at the end of the exam period.

Compulsory readings:
1/ Bender, D.A.: Nutritional biochemistry of vitamins. Cambridge University Press Cambridge New York Port Chester Melbourne Sydney 1992.

Competencies: understanding the biological role of vitamins and secondary metabolites.

Course/professor/lecturer: Judit Kosáry professor emerita

PHYSICAL PROPERTIES OF FOOD

Course code: ETFA911C
Course name: Physical properties of food
Number of hours per semester: 28
Credits: 4
Fall/Spring: Fall+Spring
Language: English
Prerequisites: None

Course type: Bachelor and Master

Department: Department of Measurement and Process Control

Course leader: Eszter Vozáry

Course requirements during the semester: Class time will be devoted to topics appropriate to the reading assignments, and to measurements of physical properties for each class period. Individual participation of students in classroom discussion is strongly encouraged and in laboratory measurements is obligatory.

Aims, objectives and description of the course: Mechanical, rheological, optical, thermal and radiation properties of foods; and the bases of physical modelling. Mechanical and rheological methods (with destruction: different penetrometrical methods; and without destruction: penetrometrical, ultrasonic, vibration methods) used in firmness and stiffness investigations; viscosimetry; internal friction measurements; rheological modelling. Measurements of thermal properties (specific heat, heat capacity, thermal conductivity; thermal diffusivity; diffusion coefficient); resolution of Fourier- and Fick-equations at different special case; heat transmission, thermal diffusion; cooling; freezing; melting; thawing; drying. Optical properties (refractive coefficient; absorption and emission spectra; optical rotation; thermo luminescence) used in food quality safety and control, and in the investigation of food structure. Methods of nuclear irradiation in the food preservation used in food quality safety and control, and in the investigation of food structure. Measurements of electrical (electrostatic, dielectric) properties; electrical impedance; electrical measurements during drying and microwave heating.

Readings:
- N.N. Mohsenin: Physical properties of plant and animal materials, 1986, Gordon and Breach Science publishers, New York
- N.N. Mohsenin: Electromagnetic radiation properties of foods and agricultural products, 1984, Gordon and Breach Science publishers, New York
- N.N. Mohsenin: Thermal properties of foods and agricultural materials, 1980, Gordon and Breach Science publishers, New York
- Rao, M.A., Rizvi, S.S.H.: Engineering Properties of Foods, Marcel Dekker Inc., 1995. (selected chapters).

Assessment, grading: Reports about laboratory measurements: 40%
Final exam: 60%

PRINCIPLES OF WINE TECHNOLOGY

Course code: ETBT901C
Course name: Principles of wine technology
Number of hours per semester: 28
Credits: 4
Fall/Spring: Fall
Language: English
Prerequisites: None

Course type: Bachelor and Master
Department: Borászati Tanszék (Department of Oenology)
Course leader: Dr. Sólyom-Leskó Annamária
Aims, objectives and description of the course:

The grape. General properties, maturation. The main vine-grape varieties. Chemical composition of grape must. Microbiota of the grapes. Processing of white grapes (crushing, destemming, pressing, must treatments). Red vinification. Alcoholic fermentation. Biochemistry and microbiology. Control of wine fermentation. Malolactic fermentation. Microbiological spoilage of wine. Aging and stabilisation of wine. Chemical fundamentals. Fining and clarification methods. Rules and methods of wine tasting. Describing wines (special vocabulary of sensory evaluation). Distinct wine styles: carbonated wines, botrytized wines, dessert wines (port, sherry etc.).

Examination requirements: written exam at the end of semester.

SENSORY ANALYSIS I.

Course code: ETAAT901C

Course name: Sensory Analysis I.

Course name (Hungarian): Érzékszervi minősítés I.

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall+Spring

Language: English

Prerequisites: none

Course type: Bachelor+Master

Department: Árukezelési, Kereskedelmi és Érzékszervi Minősítési Tanszék (Department of Postharvest, Commercial and Sensory Science)

Course leader: Dr. Kókai Zoltán

Aims, objectives and description of the course:
Ranking tests (simple ranking, scales, etc.). Descriptive tests (Profile Analysis, Free Choice Profiling, QDA, etc.). Product specific applications of sensory descriptive languages. Statistical interpretation of test results (PCA, Procrustes Analysis, Preference Mapping, etc.).

Course requirements during the semester:
Each class involves a lecture part on the actual given part of the subject. This is followed by some practical sensory tests conducted in the laboratory. Each student chooses a scientific article on sensory analysis topic, and prepares a 10 minute oral presentation.
Readings:
Compulsory reading: Kókai, Z.. Sensory analysis I-II. ISBN: 963 229 879 9 , CUB, Budapest, Recommended readings: Hildegarde Heymann, Harry T. Lawless: Sensory Evaluation of Food: Principles and Practices, 2010; handouts (selected papers).

Assessment, grading:
Final written exam

Course professor/lecturer: Dr. Kókai Zoltán

SENSORY ANALYSIS II.

Course code: ETAAT902C
Course name: Sensory Analysis II.
Course name (Hungarian): Érzékszervi minősítés II.
Number of hours per semester: 28
Credits: 4
Fall/Spring: Fall+Spring
Language: English
Prerequisites: Sensory Analysis I.
Course type: Bachelor+Master
Department: Árukezelési, Kereskedelmi és Érzékszervi Minősítési Tanszék (Department of Postharvest, Commercial and Sensory Science)

Course leader: Dr. Kókai Zoltán

Aims, objectives and description of the course:
Practical knowledge on the implementation and statistical analysis of sensory test methods
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.
Week #1: The role of sensory evaluation in quality control
Week #2: Relationship of electronic and human senses, principles of the human senses
Week #3: Monitoring of sensory quality, IT support of sensory test
Week #4: Setting up a sensory panel
Week #5: Statistical evaluation of ranking test part 1: Friedman test and Page test statistical
Week #6: Statistical evaluation of ranking test part 2: ANOVA and pairwise significant differences
Week #7: Statistical evaluation of ranking test part 3: Pairwise ranking – modified Friedman analysis. Cluster analysis.
Week #8: How to design sensory test. The use of human Senses as instruments
Week #9: The effect of brand on sensory perception
Week #10: Student's presentations part 1
Week #11: Panel performance monitoring methods.
Week #12: Consumer test and practical application of preference mapping
Week #13: Written test

Course requirements during the semester:
Each class involves a lecture part on the actual given part of the subject. This is followed by some practical sensory tests conducted in the laboratory. Each student chooses a scientific article on sensory analysis topic, and prepares a 10 minute oral presentation.

Readings:
Compulsory reading: Kókai, Z.. Sensory analysis I-II. ISBN: 963 229 879 9 , CUB, Budapest, Recommended readings: Munoz, A. M. (Ed.). (2013). Sensory evaluation in quality control. Springer Science & Business Media.; handouts (selected papers).
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Assessment, grading: Written exam

Course professor/lecturer: Dr. Kókai Zoltán

THE COMPETITIVENESS OF HUNGARIAN FOOD ECONOMY

Course code: ETEG905C

Course name: The competitiveness of Hungarian Food economy

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall

Language: English

Prerequisites: none

Course type: Bachelor+Master

Department: Department of Food Economy

Course leader: Professor Zoltán Lakner

Aims, objectives and description of the course:
Theories of competitivity; • Factors of competitively; • The Hungarian agriculture; • Factors of production • Human resource management • Know how • Capital • Domestic market conditions • Strategies of Producers • Regional product development • Functional foods • Product development strategies • Infrastructure of Agribusiness • Economic policy • Case study

Examination: exam

THEORY OF MEASUREMENT, DESIGN OF EXPERIMENTS

Course code: ETEMNFA02AMSA

Course name: Theory of Measurement, Design of Experiments

Number of hours per semester: 13+26

Credits: 3

Fall/Spring: Fall

Language: English

Prerequisites: none

Course type: MSc

Department: Department of Measurement and Process Control

Course leader: Dr. József Felföldi

Lecturers: Dr. Viktória Zsom-Muha, István Kertész

Aims, objectives and description of the course: Provide theoretical and practical knowledge on the field of experimental design, uncertainty assessment of complex measurement systems. Case studies are presented. Students meet the algorithms of up-to-date measurement methods, cutting-edge techniques. Participants gain skills in evaluation and presentation of measurement results.

Literature:

- NIST/SEMATECH e-Handbook of Statistical Methods, http://www.itl.nist.gov/div898/handbook/
- Design of Experiments (DOE) Tutorial http://www.keysight.com/upload/cmc_upload/All/DesignOfExperimentsTutorial.pdf
- http://www.statease.com/pubs/chem-1.pdf
- http://williamghunter.net/articles/101doe.cfm

Teaching and learning methods: Written handouts, interactive problem solving.

Examination: exam, teamwork, project work

COMPUTER-AIDED FLOWSHEETING

Neptun code: ETEMNEM03BMSA
Course name: Computer-aided flowsheeting
Number of hours per semester: 26
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: solid understanding of unit operations
Course type: Master
Department: Élelmiszeripari Műveletek és Gépek Tanszék (Department of Food Engineering)
Responsible lecturer: Zoltán Kovács, PhD
Course description:

- Introduction to computer-aided process design, objective and classification of process simulation tools, fields of application;
- Introduction to SuperPro Designer (Intelligen Inc., US) flow-sheeting software;
- Developing process models: performing mass and energy balances, equipment sizing, process scheduling and cycle time analysis, answering inventory, debottlenecking and throughput analysis questions;
- Case studies: Production of beta-galactosidase design case, industrial wastewater treatment design case, pharmaceutical design case;
- Problem-based learning activities: xanthan gum production, membrane diafiltration, multiple reactions, continuous anaerobic digester, dynamic analysis of batch fermentation;
- Evaluation of project economics and environmental impacts.

Preliminary study conditions: solid understanding of unit operations

Competencies:
The course will enable the students to

- understand the systems approach to process design and analysis of food, biotech, and environmental processes;
- use a comprehensive process simulator that facilitates modeling and optimization of batch and continuous processes;
- build flowsheets with SuperPro Designer (Intelligen Inc., US), registering components, initializing and scheduling unit procedures, simulating and evaluating processes, and critically viewing outputs;
- perform mass and energy balances of integrated processes, equipment sizing and costing, process scheduling and cycle time analysis;
- compare alternative processing schemes, identify size and time bottlenecks, increase plant throughput;
- evaluate project economics and environmental impacts.

Examination: written, open-book exam
Literature:

- E. Heinzle et al., Development of sustainable bioprocesses: modeling and assessment, John Wiley & Sons Ltd, West Sussex, UK, 2006
- Petrides, D.; Carmichael, D.; Siletti, C.; Koulouris, A. Biopharmaceutical Process Optimization with Simulation and Scheduling Tools. Bioengineering 2014, 1, 154-187
- SuperPro Designer, User's guide, Intelligen Inc., USA, 2019

OPTIMIZATION METHODS

Neptun code: ETEMNEM01BM2017
Course name: Optimization methods
Number of hours per semester: 26
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: solid understanding of unit operations
Course type: MSc
Department: Élelmiszeripari Műveletek és Gépek Tanszék (Department of Food Engineering)
Responsible lecturer: Zoltán Kovács, PhD
Description:
This course develops facility with using modern computational software for numerical problem solving. The scope is on the analysis and investigation of process systems via a variety of mathematical methods. Emphasis is on problem formulation, starting from a real process and developing its computer model. Several types of technical problems are considered, and their structures and common features are discussed from the mathematical programming point of view. The course uses a problem-based-learning approach. Applications are drawn from different areas of food-, bio-, and chemical engineering. Problem sets require no previous background on programming. However, it is assumed that participants have a basic knowledge of material and energy balances of biochemical processes. Participants should be able to follow the engineering related portions of the text, as well as its notations and scientific deductions easily. Regarding mathematics, participants should be familiar with calculus, linear algebra and matrices, as well as differential equations, all at elementary (i.e. undergraduate) level.

Contents:
1. Introduction to numerical software packages.
2. Material balances for process flow sheets, split-fraction concept, Nagiev-Rosen technique, matrix representation of linear systems, Gaussian elimination, processes including recycling streams and chemical reactions.
3. Steady-state process modeling and design, solving a set of nonlinear equations, iterative methods (Newton's, bisection, secant, etc.).
4. Bifurcation and multiplicity of steady-states.
5. Analysis of process dynamics, solving a set of ordinary differential equations, numerical integration techniques.
7. Mathematical programming, elements of optimization, formulation of optimization problems, classification of optimization problems, mixed integer nonlinear program, linear programming.
8. Estimation of parameters from data, nonlinear least squares, parameter estimation with differential equation models.

Programming environment:
A numerical software package Scilab (Scilab Enterprises S.A.S) is used as programming environment.

Competencies:
By completing this course, participants will be able
• to recognize the structure of common technical problems occurring in bio-, chemical, and food engineering;

• to translate problems into mathematical language by abstracting its essence and representing it as a series of mathematical relationships;
• to use numerical software packages to model processes;
• to apply optimization techniques to find best solution.

Literature:

(1) L. T. Biegler, Nonlinear Programming: Concepts, Algorithms, and Applications to Chemical Processes, SIAM, Philadelphia, 2010
(2) S. Elnashaie, F. Uhlig, Numerical Techniques for Chemical and Biological Engineers Using MATLAB : A Simple Bifurcation Approach, Springer, New York, 2007
(3) B. Lev and H.J. Weiss, Introduction to Mathematical Programming: Quantitative tools for decision-making, North-Holland, New York, USA, 1982
(4) E.K.P. Chong and S.H. Zak, An Introduction to Optimization, Wiley-Interscience Publication, USA, 2nd Edition, 2001

DIGITAL PHOTOGRAPHY AND PHOTO EDITING FOR IMAGE PROCESSING

Course code: ETEMNFA02CB
Course name: Digital Photography and Photo Editing for Image Processing
Number of hours per semester: 26
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: Bachelor+Master+Doctoral
Department: Department of Measurement and Process Control
Course leader: Dr. László Baranyai
Lecturers: Dr. Péter Bodor-Pesti

Aims, objectives and description of the course:
During this course, the following areas are discussed: advantages of different camera systems, including sensor types and image file formats; basic rules of composition, illumination, the exposure triangle; usage of creative and advanced exposure modes; effect of zoom, sharpness, depth of field. Image editing is introduced in GIMP software (free software) and recommended workflow is presented (Darktable, AfterShot Pro).
Topics:
- Basics of camera (CMOS, CCD sensors) and image types (JPG, TIFF, RAW)
- Compositional rules (center alignment, rule of thirds, golden ratio)
- The exposure triangle (ISO, shutter speed, aperture)
- Sharpness and depth of field
- White balance and color adjustment
- Aperture and shutter priority modes
- Special needs for topics: still life, sport, night (blue hour), light painting, etc.
- Free picture editor software: GIMP
- Crop of images and automatic corrections
- Levels, curves and tone mapping
- Selection tools
- Layer and mask, blending modes
- Personalization with frames
- Workflow demonstration using Darktable, AfterShot Pro, etc.

Teaching and learning methods: Written handouts, interactive problem solving.

Examination: project presentation

FOOD PHYSICS

Course code: ETEMNFA04BMSA
Course name: Food Physics
Number of hours per semester: 26+13
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: Master
Department: Department of Measurement and Process Control

Course leader: Dr. Eszter Emília Vozáry

Aims, objectives and description of the course:
Physical properties of food; measurement of physical parameters, physical models of food; Mechanical properties: shape, size, volume and density; Optical properties: reflection, light absorption, light emission, colour, measurement of colour; Near Infrared spectroscopy: measurement and evaluation of NIR spectrum; Heat and mass transfer: measurement of thermal conductivity and diffusion coefficient; Electromagnetic characteristics of food: measurement of electrical impedance spectrum of food, determination of electrical permittivity and conductivity of food from impedance spectrum.

Teaching and learning methods: Written handouts, interactive problem solving.

Examination: written examination.

INFECTIOUS DISEASES

Course code: ETMB905C
Course name: Infectious Diseases
Number of hours per semester: 26
Credits: 4
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: BSc and MSc
Department: Department of Microbiology and Biotechnology
Course leader: Dr. Gabriella Kiskó assistant professor, Dr. Csilla Mohácsi-Farkas, professor

Aims, objectives and description of the course:
General concepts of epidemiology: the study of the determinants, occurrence, distribution, and control of health and disease in a defined population. Definition of the parameters of a disease, including risk factors, development the most effective measures for control. Large outbreaks in the past and its effect on the society, economy and history. Emerging pathogens.

Examination: written examination.

Literature:
Baron, S. (Ed.): Medical Microbiology, 4th edition. University of Texas Medical Branch at Galveston, Galveston, Texas Galveston (TX): University of Texas Medical Branch at Galveston; 1996. ISBN-10: 0-9631172-1-1
Montville, T.J., Matthews, K.R.: Food Microbiology. An Introduction. Second Edition. ASM Press, Washington DC, 2008. ISBN 978-1-55581-396-3

Competencies: Students will be able to estimate and analyse the risk and epidemiological importance of certain pathogenic microorganisms.

MICROBIOLOGICAL SAFETY OF FOOD

Course code: ETMB902C
Course name: Microbiological Safety of Food
Number of hours per semester: 26
Credits:
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: BSc and MSc
Department: Department of Microbiology and Biotechnology
Course leader: Professor Anna Maráz

Aims, objectives and description of the course:
Microbiological Safety of Food

Examination: written examination.

ORGANIC CHEMISTRY

Course code: ETAK902C

Course name: Organic chemistry (Advanced food and nutritional organic chemistry)

Number of hours per semester: 28

Credits: 4

Fall/Spring: Fall/Spring

Language: English

Prerequisites: Fluency in English, completed courses and exams in General and Inorganic Chemistry

Course type: Bachelor+Master

Department: Alkalmazott Kémia Tanszék (Department of Applied Chemistry)

Course leader: Judit Kosáry professor emerita

Aims, objectives and description of the course:
In describing the formulas and reaction equations of basic organic compounds, in addition to some basic cases, we usually deal with reactions that are also important for biochemistry and nutrition. The investigative way of discussing the reactivity and reactions of organic compounds on the basis of the electron distribution phenomena prevalent in the compounds aims to acquire the logical analytical ability necessary to understand the relationships of the processes taking place in living organisms.

Course schedule: Relationships between carbon skeletons and functional groups. General rules of organic reactions. Types of carbon skeletons: alkanes, cycloalkanes, olefins, conjugated polyenes (simple lipids), alkines, aromatic ring systems. Types of simple functional groups: halogen, hydroxyl group, ether group and amino group. Characterization of the carbonyl groups (carbohydrates). Types of complex functional groups: carboxylic group (α-amino acids), ester group (complex lipides) and amide group (proteins). Heteroaromatic ring systems (nucleic acids). Relationships between vitamins and coenzymes. For more information see the homepage of Judit Kosáry professor emerita: (https://jkosary.wordpress.com/).

Assessment, grading: On the basis of the written examination at the end of the exam period.

Competencies:
Transfer of organic chemistry knowledge necessary for the acquisition of Biochemistry, Food Chemistry and Microbiology subjects and for the understanding of the behavior of biomolecules. Description of the harmful and polluting effects of organic compounds.

Course/professor/lecturer: Dr. Kosáry Judit professor emerita

WINE MICROBIOLOGY

Course code: ETBT903C
Course name: Wine microbiology
Number of hours per semester: 26
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: BSc and MSc
Department: Department of Winery
Course leader: Annamária Sólyom-Leskó

Aims, objectives and description of the course:

Advanced course for the students having basic knowledge on microbiology and biochemistry.

Topics of the course:-Factors influencing the alcoholic fermentation in grape must.-Role of Botrytis cinerea in wine making. Grey rot. Noble rot. -Microbiology and technology of Tokaji Aszú and Tokaji Szamorodni wines. -Role of yeasts in secondary wine fermentations. Sparkling wine making. -Aging of wines by film-forming Saccharomyces cerevisiae (sherry making)-Microbiological fundamentals and control of malolactic fermentation.-Wine spoilage.Microbiological stabilisation of wines.-Cork-related problems. Processing of cork stopper.-Development and use of starter cultures in winemaking.-Killer yeasts (molecular basis and practical importance).

Examination: written examination.
Literature:

- Ildikó Magyar: Microbiological aspects of winemaking. Textbook. Corvinus University of Budapest, 2006
- Ribéreau-Gayon et al. Handbook of Enology. Volume 1. The Microbiology of Wine and Vinification. Wiley LTD, Chichester, 2000.
- Fleet, G.H.: Wine Microbiology and Biotechnology. Harwood Academic Publishers, 1993.

CONSUMER SENSORY TESTING

Course code: ETEMNAA01CM
Course name: Consumer Sensory Testing
Number of hours per semester: 26
Credits: 4
Fall/Spring: Fall+Spring
Language: English
Prerequisites: none
Course type: Bachelor+Master
Department: Árukezelési, Kereskedelmi és Érzékszervi Minősítési Tanszék (Department of Postharvest, Commercial and Sensory Science)

Course leader: Dr. Attila Gere

Aims, objectives and description of the course:

Students learn the most widely applied consumer sensory methods used in the international scientific literature and practice. During the course, not only the theoretical backgrounds of the methods but the key elements of their application, DOE, and statistical evaluation is also covered.
Course schedule:

1. week: Introduction, project work discussion, laboratory practices.
2. week: Critical points of sensory evaluation, good sensory practice.
3. week: Expert and consumer sensory tests, Types of consumer sensory tests.
4. week: Scales (types and applications).
5. week: Penalty Analysis theory and backgrounds
6. week: Penalty Analysis in practice
7. week: Preference mapping theory and backgrounds, expert panel performance evaluation
8. week: Statistical methods of preference mapping (principal component analysis, categorical principal component analysis, correspondence analysis)
9. week: Preference mapping in practice
10. week: Free Choice Profiling
11. week: Check-all-that-apply method
12. week Time Intensity tests, Temporal Dominance of Sensation
13. week: project work presentation
14. week: exam

Strong theoretical and practical knowledge about recent consumer sensory evaluation methods including their application, DOE, and statistical evaluation.

Assessment, grading: Written exam

PROGRAMMABLE LOGIC CONTROLLERS AND INDUSTRIAL APPLICATIONS

Course code: ETFA002C
Course name: Programmable logic controllers and industrial applications
Number of hours per semester: 26
Credits: 4
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: BSc+MSc
Department: Department of Measurement and Process Control
Course leader: Dr. Zoltán Kovacs
Lecturers: Dr. Zoltán Gillay, István Kertész

Aims, objectives and description of the course:

1. week Programmable logic controller (PLC) systems
2. week Structure of the PLCs
3. week PLC programming languages, leather diagram and function block program
4. week Leather diagram programming in practice
5. week Function block programming in practice
6. week PLC in open loop and closed loop control systems
7. week Programming exercise by ladder diagram, programming model machines
8. week Programming exercise by function block programming method, programming model machines
9. week Application of PLC to open loop and closed loop control systems
10. week Individual solving different programming tasks
11. week Individual solving different programming tasks
12. week Presentation of a PLC program developed by the student

Teaching and learning methods: Written handouts, interactive problem solving.

Assessment, grading: Project work presentation

COMPLEX FOOD ANALYSIS

Course code:
Course name: Complex food analysis
Number of hours per semester: 39+39
Credits: 6
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Applied Chemistry

Course leader: Dr. László Abrankó, PhD

Aims, objectives and description of the course:
In this subject, after presenting the theoretical introduction, students will be introduced to some test methods, applied in food industry as a part of quality control or product development. During the sessions, selected examples will be presented highlighting techniques such as rotational and oscillation viscosimetry suitable for characterisation of rheological properties of foodstuff, or techniques such as chromatography, which is suitable for the analysis of various ingredients in food, or methods suitable for monitoring changes in meat proteins such as DCS method or gel-electrophoresis and methods used for the analysis of physical properties of food. During the practical sessions students are delegated to groups to carry out manual laboratory work based on real-life examples, which are closely related to the topics of the theoretical lectures presented previously. Measurement results obtained during the practical sessions should be evaluated and synthesised individually, and a report, including tasks that require individual literature research should be submitted. Due to the interdisciplinary nature of this subject, it is presented by representatives of multiple departments. This subject consists of both theoretical and practical sessions. (In the part-time training programme, only a demonstration using the relevant equipment is given instead of practical sessions including manual work in small groups.)

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: Project work report and written exam

Literature: Mohsenin, N.N: Physical properties of plant and animal materials, 1986, Gordon and Breach Science publishers, New York
Ludger O. Figura, Arthur A. Teixeira: Food Physics, Springer, Heidelberg, 2007. ISBN 978-3-540-34191-8

Course professor/lecturer: Vozáry Eszter, PhD, Kaszab Tímea, PhD, Abrankó László, PhD, Zeke Ildikó, PhD, Kovács Zoltán, PhD, Szabó-Nótin Beatrix, PhD

PROCESS CONTROL IN THE FOOD INDUSTRY I.

Course code: ETEMNFA03AMSA
Course name: Process Control in the Food Industry I.
Number of hours per semester: 13+26
Credits: 3
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Measurement and Process Control

Course leader: Dr. Zoltán Kovacs

Aims, objectives and description of the course:
The main goal of the subject is to develop skills in Process Control in the Food Industry including different controlling systems. Further goal is to gain knowledge how to design a technological work flow and how to program and simulate PLC programs. Students take part in laboratory practices where they can see different control systems and their different parts.

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: Design a technological work flow, individual project: Programing task with a Programmable Logic Controller simulation, oral exam

Literature: William C. Dunn: Fundamentals of Industrial Instrumentation and Process Control, 2005

Course professor/lecturer: István Kertész, Dr. Zoltan Kovacs

ENVIRONMENT-, WATER- AND ENERGY MANAGEMENT

Course code: ETEMNEM02AM
Course name: Environment-, Water- and Energy management
Number of hours per semester: 39
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Food Engineering
Responsible lecturer: Dr. Zoltan Kovacs

Aims, objectives and description of the course:
The course environment, water and energy management will provide the knowledge about remediation of water and air pollutions through advanced and biochemical route. Among different colors of biotechnology, green biotechnology will be emphasized coupled with grey biotechnology. Three different parts of lecture are (a) Phytoremediation of air pollution and its impact on environment, (b) Innovation of renewable energy, more specifically biofuels and their characteristics, and (c) Wastewater treatment through advanced and environmental benign processes. Furthermore, lectures shall be dedicated about advanced bioremediation process, which can be a two-fold solution of the dilemma of wastewater treatment and energy crunch.

Teaching and learning methods: lectures, handouts
Assessment, grading: written exam, group assignment
Literature: •

- G. Tchobanoglous, F. L. Burton, H. D. Stensel, Metcalf & Eddy, Inc., F. Burton, Wastewater Engineering: Treatment and Reuse, Publisher: McGraw-Hill Education, 2003, ISBN 0070418780, 9780070418783
- M. Scholz, Sustainable Water Treatment, Elsevier, USA, 1st Edition, 2018, ISBN: 9780128162460
- Efficient Management of Wastewater, I. Al Baz, R. Otterpohl, C. Wendland, Springer, USA, 2008, ISBN 978-3-540-74492-4
- M. J. Kozioł and F. R. Whatley, Gaseous Air Pollutants and Plant Metabolism, 1st Edition, Elsevier, USA, 1984, ISBN: 9781483165363

Course lecturer: Dr Arijit Nath,PhD

FOOD SAFETY RISK ANALYSIS

Course code:
Course name: Food safety risk analysis
Number of hours per semester: 26+13
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Microbiology and Biotechnology

Course leader: Mohácsiné dr. Farkas Csilla, PhD, professor

Aims, objectives and description of the course:
Definition of risk, subjectivity of risk perception. Necessity of risk analysis in ensuring food safety. Microbiological and chemical risks in food. Key elements of risk analysis. Differences in chemical and microbiological risk assessment. Basics of microbiological risk assessment. Predictive microbiological modeling in exposure assessment. Identification of chemical hazards. Relations between chemical hazards and responds, relations. Quantitative risk analysis on examples of pesticides, toxins, food additives. The risk of radioactivity. Risk management and risk communication.

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: written examination, group work of students

Literature:
Forsythe, S.J.: The Microbiological Risk Assessment of Food. Blackwell Publishing, 2002.
Pérez-Rodrigez, F.,Valero, A.: Predictive Microbiology in Foods. Springer, New York, 2013. ISBN 978-1-4614-5520-2
Guidance on Uncertainty in EFSA Scientific Assessment, EFSA, 2015.

Course professor/lecturer: Dr. Fodor Péter, DSc, prof. emeritus; Dr. Kasza Gyula, PhD, professor, Dr. Engelhardt Tekla, PhD, assistant professor

MASS AND ENERGY TRANSFER PROCESSES

Course code: ETEMNEM01AM2017
Course name: Mass and Energy Transfer Processes
Number of hours per semester: 26+13
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Food Engineering

Course leader: Dr. Bánvölgyi Szilvia, PhD

Aims, objectives and description of the course:
Mathematical modelling of batch and continuous mass- and energy transfer processes, balance equations in differential form, solutions of these equations. Principles of absorption and adsorption. Unsteady-state heat transfer and unsteady-state diffusion. Continuous and batch distillation, rectification (multistage distillation). Design of the equipments.

Assessment, grading: writing exam (theoretical, calculation)

Literature:
Bird, R.B., Stewart, W.E., Lightfoot E.N. (2002): Transport phenomena. New York. Wiley International. ISBN: 0471410772

Basmadjian, D. (2007): Mass Transfer and Separation Processes, Principles and Applications (Second Edition). Boca Raton. CRC Press. ISBN: 9781420051599

Toledo, R.T. (1999): Fundamentals of Food Process Engineering (Third Edition). New York. Springer. ISBN: 0387290192

Sattler, K., Feindt, H.J. (1995): Thermal Separation Processes, Principles and Design. Weinheim. VCH Verlagsgesellschaft mbH. ISBN: 3527286225

Course professor/lecturer: Dr. Bánvölgyi Szilvia, PhD

MICROBIOLOGICAL SAFETY OF AND QUALITY IN FOOD PRODUCTION

Course code:
Course name: Microbiological safety and quality in food production
Number of hours per semester: 26
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Microbiology and Biotechnology

Course leader: Dr. Gabriella Kiskó, associate professor, PhD

Aims, objectives and description of the course:
Students acquire knowledge of factors that determine the microbiological quality and safety of food commodities and raw materials; the effect on processing operations on microorganisms, microbial stress tolerance and stress adaptation. Insight into the state of the art of microbiological test methods and their potential application in the food analysis, and - control.

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: exam, Case study and preparation of a simplified HACCP system in teamwork

Literature:
Luning, P. A., Devlieghere, F., Verhé, R. (eds) 2006. Safety in the agri-food chain, Wageningen Academic Publishers.
Jay, J., Loessner, M. J., Golden, D. A. 2005. Modern food microbiology, Springer, New York.

Course professor/lecturer: Mohácsiné dr. Farkas Csilla, professor, PhD; Dr. Belák Ágnes, associate professor, PhD

NUTRITION SCIENCE

Course code:
Course name: Nutrition science
Number of hours per semester: 26
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Food Chemistry and Nutrition

Course leader: Dr. Zsuzsanna Mednyánszky, PhD

Aims, objectives and description of the course:
The aim of the subject is to provide advanced nutrition knowledge on nutrition science, on intermediate metabolism, on the bioavailability of nutrients, on nutrition-related diseases and their diets that meet specific needs.

Teaching and learning methods: Handouts

Assessment, grading: exam

Literature:
Ganong F. (1995): Az orvosi élettan alapjai. Medicina. ISBN963242302X
Ádám V. (2006): Orvosi biokémia. Medicina, 2006. https://hu.scribd.com/doc/238833983/Orvosi-Biokemia
Hajós Gy., Zajkás G.(2000): A táplálkozás egészségkönyve. Kossuth Kiadó. ISBN 9630941031
Varró V. (1997): Gasztroenterológia. Medicina. ISBN 9632422600
Szaklapok: Metabolizmus, Orvosi Hetilap

Course professor/lecturer: Zsuzsanna Mednyánszky, PhD

QUALITY MANAGEMENT

Course code: ETEMNAA04ABSA
Course name: Quality management
Number of hours per semester: 26
Credits: 3
Fall/Spring: Spring
Language: English
Prerequisites: none
Course type: MSc
Department: Árukezelési, Kereskedelmi és Érzékszervi Minősítési Tanszék (Department of Postharvest, Commercial and Sensory Science)

Course leader: Dr. László Sipos, PhD

Aims, objectives and description of the course:
This course will provide attendees with the knowledge to understand the importance of Quality management and Food Safety. This course will address the following areas: quality objectives; structure and principles of the ISO 9000 series standards; quality management systems and requirements; risk based thinking, Plan-Do-Check-Act methodology, HACCP system and application; Food safety management systems (ISO 22000:2005; ISO 22004:2014; prerequisite programmes on food safety, IFS (International Food Standard), BRC (British Retail Consortium), guidelines for auditing management systems, auditing (processes and techniques for planning, conducting and reporting audits).

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: Final written exam

Literature:
Ernyei Gy., Sipos L. (2006): Minőségmenedzsment, Quality Management. Budapest. Aula Kiadó. ISBN:9639698067
Mortimore, S., Wallace, C. (1995): HACCP a practical approach. London. Chapman and Hall. ISBN: 0 412 57020 3
ISO 9000:2015 quality management systems — fundamentals and vocabulary
ISO 9001:2015 quality management systems — requirements
ISO 22000:2018 food safety management systems — requirements for any organization in the food chain
ISO 22004:2014 food safety management systems — guidance on the application of iso 22000
ISO/TS 22002-1:2009 prerequisite programmes on food safety — part 1: food manufacturing
ISO/TS 22002-2:2013 prerequisite programmes on food safety — part 2: catering
IFS International Food Standard
BRC (British Retail Consortium) Global Standard for Food Safety

Course professor/lecturer: Dr. László Sipos, PhD

TECHNOLOGY AND PRODUCT DEVELOPMENT

Course code:
Course name: Basics of Technology and Product development
Number of hours per semester: 26
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Árukezelési, Kereskedelmi és Érzékszervi Minősítési Tanszék (Department of Postharvest, Commercial and Sensory Science)

Course leader: Géza Hitka, PhD

Aims, objectives and description of the course:
The main purpose of food production to develop products which are corresponding to the food needs, market expectations and the consumer needs, which also meets the criteria for market competitiveness. The main aims of food product development to develop products which can appropriate to these needs, continuously updated, fulfill the food laws and food safety standards and survive in the competitive market. Product development requires a complex and cross-disciplinary scientific rigor seeking activity that prepared professionals. Course themes of the chapters presented in the description of the student's mastery of theoretical knowledge and practical examples possession of the knowledge and experience acquired in this topic for learning. Product development requires a complex and cross-disciplinary scientific activity that needs professionals.

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: exam and presentation of project work

Literature:
Fuller G.W. (2004): New Food Product Development G.W. Fuller Associated Ltd, Montreal, Canada
Baker R.C, Hahn P.W., Robbins K. R. (1988): Fundamentals of new food development

Course professor/lecturer: Zoltán Kókai, PhD, Mónika Stégerné Máté, PhD

PLANT DESIGN AND PLANNING

Course code:
Course name: Plant design and planning
Number of hours per semester: 13+13
Credits: 3
Fall/Spring: Fall
Language: English
Prerequisites: none
Course type: MSc
Department: Department of Food Preservation

Course leader: Dr. Mónika Stégerné Máté, PhD

Aims, objectives and description of the course:
The process and conditions of design and establishment of the food production plant. Process, energy demand, work safety of food production. Harmony of the technology line, machine specification. Special Disciplinary Regulations for the Food Processing Plant. Additional facilities, warehousing and storage. Connection between plant and environment. Legal conditions for the establishment and operation of a food production plant. The Food Act and its accompanying regulations, relevant regulations. Define the profile of the planned plant (raw materials, products and preservation methods). Selecting the location of the investment, assessing the raw material background and the market opportunity. Limiting the size and capacity of the plant. The material turnover of production. Preparation of the implementation study plan (decision preparation). Contents and role of the study. To assess economic conditions of establishment of the plant and creating its financial background. The process and steps of planning. Technological design documentation. Technological equipment, machine specification. Placement of the buildings of the plant and design its environment. Design, architectural and hygienic aspects of design. Preparation of plans for professional (architecture, energy supply, water management, wastewater treatment, building engineering, information system). Planning the production of supplementary facilities (social rooms, warehouses, storages, laboratories, offices, waste management, etc.). Plant and personal hygiene regulations. The process of authorization procedure of food plant establishment according to the legislation in force. Selecting participants of finishing, tendering, contracting. The process of execution and technical documentation. The investment into commissioning. Transfer, receipt, trial operation. Development of the quality management system. Documentation of production and control.

Teaching and learning methods: Handouts, interactive problem solving.

Assessment, grading: exam and project work

Literature:
Barta J.: Fruit processing plant. In: Hui Y. H.: Handbook of fruits and fruit processing: Science and technology. Blackwell Publishing, USA, 2006.

Course professor/lecturer: Dr. Szabó-Nótin Beatrix, Dr. Szalóki-Dorkó Lilla, Furulyás Diána, Dr. Bánvölgyi Szilvia

FOOD PACKAGING AND SAFETY

Course code: ETKT902C

Course name: Food packaging and safety

Number of hours per semester: 26

Credits: 4

Fall/Spring: Fall + Spring

Language: English

Prerequisites: -

Course type: bachelor + master

Department: Konzervtechnológiai Tanszék (Department of Food Preservation)

Course leader: Székely Dóra

Aims, objectives and description of the course:
Principles and requirements of food packaging, the relationship between packaging and shelf life, markings on food packaging, environmental polluting aspects of packaging, packaging design

Course requirements during the semester:
Lectures about theoretical knowledge of food packaging
Student's presentations about certain practical, technological, legislative aspects of food packaging

Readings:
Compulsory readings:A.Grumezescu, A. M. Holban: Food Packaging and Preservation. Academic Press, 2017.
Recommended reading:
J. Hang: Innovations in Food Packaging. Academic Press, 2013.

Examination requirements: written exam at the end of semester

Course professor/lecturer: Székely Dóra, Szabó-Nótin Beatrix