REQUIREMENTS
2021/2022. academic year 2 nd semester

Name and code of the subject: Modern methods of food analysis I. Spectroscopy, MTMEL7008A
Name and title of the person responsible for the subject: Prof. Dr. Béla Kovács, professor
Additional instructors involved in teaching the subject: Áron Béni
Name and level of the program: MSc in Food safety and quality engineer sciences, 2.
Subject type: compulsory
Teaching timetable of the subject, type of examination: 2 + 2
Credit value of the subject: 5

Purpose of teaching the subject: The task of the subject is: the students get acquainted with the most important instrumental analytical measurement methods, which are necessary to determine the quality and quantity of food raw materials and food productions. What the students learned already within the frame of the similar subject (Instrumental analytics) on the Food Engineering BSc. course, their knowledge will extend and they will get a more detailed educational material (theoretical and practical knowledge) for instrumental measurement techniques (UV-VIS absorption spectrophotometry, FAAS, GF-AAS, ICP-OES, ICP-MS). The performance characteristics of analytical methods, moreover the simplified diagram of a multielemental chemical analysis will be detailed also.

Content of the subject (14 weeks):

1. week: The science of colloid, historical overview, the concept of the colloidal state, the classification and general characterization of colloidal systems.
2. week: The grouping of material systems, classifications of colloidal systems, grouping on the basis of the dispersed nature and the interactions between the particles.
3. week: Factors determining properties of colloidal systems, the shape of a disperse system, the size of the dispersed parts, general characterization of the major systems, incoherent systems.
4. week: Aero disperse systems, liquid medium disperse systems, gas dispersions, foams.
5. week: Suspensions, emulsions, solid medium disperse systems, macromolecular colloidal solutions, association colloids.
6. week: Coherent systems, gels, liquid medium concentrated disperse systems
7. week: Dry powder agglomerations, solid foams, solid macromolecules, kinetic regularities.
8. week: General descriptions of the most important laws. Brownian motion, diffusion, osmosis, sedimentation, stability of disperse systems.
9. week: Coagulation, stability and coagulation of suspensions, stability of foams, status changes of gels.
10. week: Rheological properties, rheological basic concepts, deformations, elastic deformations, flows.
11. week: The concepts of strength and consistency, behavior of non-Newtonian liquids, rheology of colloidal systems, viscosity of disperse systems, flow of suspensions.
12. week: Viscosity of solutions of yarn shaped polymer molecules, viscosity of emulsions, structural viscosity of disperse systems, main food colloidal systems, food suspensions, food emulsions, food gels.
13. week: Protein gels, polysaccharide gels, food foams.
14. week: Food complex colloidal systems, food dual systems, other colloidal stabilizers.

Type of mid-term examination:
Assignments to be submitted

Method of assessment (semester examination mark - report, practical grade, colloquium, examination):
70 % attendence and fulfilment of the tasks is compulsory for the signature. Final grad is deduced from results of mid-term accomplishments and the results of the final exam.

Teaching aids:
To be find in e-learning

Recommended literature:

Cosgrove T.: 2005. Colloid Science, Principles, Methods and Applications. Bristol, UK. Blackwell Publishing Ltd.
Belitz D., Grosch W., Schieberle P.: 2004. Food Chemistry, Springer Verlag.
Fennema O.: 1996. Food Chemistry, Marcel Dekker.
Mohsenin N.N.: 1986. Physical properties of plant and animal materials, Gordon and Breach Science publishers, New York.
Ludger O. Figura, Arthur A. Teixeira: 2007. Food Physics, Springer, Heidelberg.

REQUIREMENTS
2021/2022 academic year II. semester

Name and code of the subject: Nutritional sciences (MTMEL7009A)
Name and title of the person responsible for the subject: Dr. Vágó Imre, associate professor
Additional instructors involved in teaching the subject: -
Name and level of the program: Food Safety and Quality Engineering MSc
Subject type: obligatory
Teaching timetable of the subject, type of examination: 2+0 C
Credit value of the subject: 3

Purpose of teaching the subject: to provide the students advanced knowledges which are necessary to choose the most suitable food raw materials and kitchen techniques when preparing special foods

Content of the subject (14 weeks):
1st week: Content of subject "Nutritional Sciences", organs and their functions of the 1st gastrointestinal tract
2nd week: Nutritional assessment and dietary planning. Dietary Reference Intakes (DRIs), Estimated Average Requirements (EARs), Recommended Dietary Allowances (RDAs), Adequate Intake (AI), Tolerable Upper Intake Levels (ULs), Safe Maximal Intakes, Energy Intake

3rd week: Nutritional assessment and dietary planning. Dietary Reference Intakes (DRIs), Estimated Average Requirements (EARs), Recommended Dietary Allowances (RDAs), Adequate Intake (AI), Tolerable Upper Intake Levels (ULs), Safe Maximal Intakes, Energy Intake

3rd week: Chemical, biological and physiological aspects of nutrition. Acid-base equilibrium, passive and active transports, HCl synthesis in the stomach wall cells

4th week: Bio-catalysers. Role and structure of enzymes. Factors influencing enzyme activity: activators, inhibitors and destructors, temperature, pH-values, enzyme and substrate concentrations

5th week: Carbohydrates: structure and role of mono-, di- and oligosaccharides; functions of polysaccharides of plants and animals/human beings

6th week: Structure of protein building amino acids. Definition of non-essential, essential and conditionally essential amino acids. Amid and peptide bonds. Protein structures and shapes, way of protein synthesis and hydrolysis. Complete and incomplete proteins, protein complementation, protein quality

7th week: Lipoids and lipids. Neutral lipids and phospholipids. Biosynthesis and metabolism of fatty acids and lipids. Essential and conditionally essential fatty acids, omega-3 fatty acids

8th week: Energy metabolism. Synthesis of ATP molecules: Reactions and energetic results of citric acid cycle (Szent-Györgyi - Krebs cycle) and the sequential oxidative phosphorylation processes

9th week: Energy balances and body weight regulation. Basal metabolic rate (BMR), basal energy expenditure (BEE), resting metabolic rate (RMR), resting energy expenditure (REE), standard metabolic rate (SMR)

10th week: Fat soluble vitamins (The "DEKA" vitamins) – their structure, chemical composition, physiological role, symptoms of hypo- and avitaminosis, reason and symptoms of hypervitaminosis. Night blindness, rickets. Natural sources of A-, D-, E- and K-vitamins

11th week: Water soluble vitamins – their structure, chemical composition, physiological role, symptoms of hypo- and avitaminosis. RDA values

12th week: The major mineral nutrient elements of foods – C, O, H, N, P, K, Ca, Mg, S, Na. Sources and role of the macroelements.

13th week: The minor mineral nutrient elements of foods – Fe, Mn, Zn, Se, Ni, Cr, I, F. Sources and role of the microelements.

14th week: Main function of water in the human body. Aging and water content of human body. Water hardness: definition, sources, determination methods, optimum physiological level, water softening methods

Type of mid-term examination: Each student independently prepare a ppt presentation from a pre-arranged part of the subject

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): oral colloquium

Teaching aids: ppt

Recommended literature:

Michelle McGuire – Kathy A. Beerman (2013*): Nutritional sciences – From fundamentals to food. Wadsworth Cengage Learning. 3rd Edition*

Debrecen, 2022.02.01.

Dr. Vágó Imre
associate professor

REQUIREMENTS
2021-2022 academic year, 2nd semester

Name and code of the subject: Essential molecular cell biology, MTMEL7010A
Name and title of the person responsible for the subject: Dr. Endre Máthé, associate professor PhD
Additional instructors involved in teaching the subject: -
Name and level of the program: Food safety and quality engineering MSc
Subject type: compulsory;
Teaching timetable of the subject, type of examination: 2 lect. + 2 pract.2nd semester, oral

Credit value of the subject: 4

Purpose of teaching the subject:
Students will understand and the structural and functional properties of eukaryotic cells, and will learn to analyse and interpret the spatial and temporal control of stochastic and determinative cellular phenomena in the context of cellular compartmentalization, cell cycle regulation, genomic integrity and evolution. Special emphasis will be put on topics like the nutrition and health/diseases type of correlations; the preventive and therapeutic nutrition; the functional and medical foods,

Content of the subject (14 weeks):
LECTURES:
Course objectives:
1-3. Analysis of cellular and molecular levels of organization of living material, and system biology type of investigation methods.
4-5. Regulation of eukaryotic gene expression: transcription, translation, protein folding and degradation. The genomic integrity.
6-7. Epigenetic regulation of gene expression. Morphogenetic events and cell differentiation. Diurnal cycle.
8-9. Eukaryotic cells metabolism and energetic management, and the regulation of cellular homeostasis.
10-11. Cellular redox potential, ageing and adaptive stress responses.
12-13. Transgenic organisms and genetically modified foods.
14. The cellular basis of preventive nutrition.
PRACTICALS:
1-2. Assessment of cellular viability and toxicity.
3-4. Molecular investigation methods.
5-8. PCR cloning, CRISP/CAS9 genome editing and analysis of transgenic organisms.
9-10. Data mining using bioinformatics databases.
11-14. In silico genome-, proteome- and interactome analysis.

Type of mid-term examination: participation in the practicals is mandatory. Attendance at 70% of the practicals is mandatory. In case of absence, a report must be submitted by the student within two weeks from the missed practice (theoretical and practical description).
Participation in the practicals is a precondition for the final exam.

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): colloquium

Teaching aids: lecture specific PPTs, research/review papers

Recommended literature:

• Alberts, B., Brey, D., Hopkin, K., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P. (2016). Essential cell biology. 4th edition. Garland Science, Taylor & Francis Group, New York, USA. ISBN-13: 978-0815344544
• Alberts, B., Johnson, A, Lewis, J. Morgan, D., Raff, M., Roberts, K., Walter, P. (2014). Molecular Biology of the Cell. Sixth Edition. Garland Science, Taylor & Francis Group, New York. ISBN-13: 978-0815344322
• Pollard, T.D., Earnshaw, W.C., Lippincott-Schwartz, J. and Johnson, G. (2017). Cell Biology, 3rd Edition, Elsevier, ISBN: 9780323341264
• PUBMED database

REQUIREMENTS
2021/22 academic year 2nd. semester

Name and code of the subject: MTMEL7011 Microbiological aspests of food safety and quality
Name and title of the person responsible for the subject: Prof. Dr. Karaffa Erzsébet Mónika, full professor
Additional instructors involved in teaching the subject: Dr. Peles Ferenc Dr. Pál Károly,
Name and level of the program: Food quality and safety engineer, MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 2+2, P
Credit value of the subject: 4

Purpose of teaching the subject:
The aim of the subject is to provide knowledge about the foodborne pathogens and foodborne diseases. The microbiota of the different food products, and their characteristic microbiota, focusing on the microbes causing spoilage and foodborne pathogens.
Basic skills and knowledge during the practice enables student to plan and do food microbiological examinations for quality detection.

Content of the subject (14 weeks):

1. History of Microorganisms in Food. Role, and Significance of Microorganisms in Foods. Microorganisms and food materials.
2. Introduction to Foodborne Pathogens. Faecal-oral infection route of foodborne pathogens. The pathogenesis of foodborne diseases. Az élelmiszer eredetű kórokozók patogenitásának helyei.
3. Food Poisoning Caused by Gram-Positive Spore-forming.
4. *Staphylococcus aureus* and staphylococcal gastroenteritis. Az

ételmérgezésekben szerepet játszó *Staphylococcus aureus*. Listeria monocytogenes and foodborne listeriosis.
5. *Salmonella* genus and foodborne gastroenteritis caused by *Salmonella*.
6. *Escherichia coli* and foodborne gastroenteritis caused by *Escherichia coli*.
7. *Shigella* genus and shigellosis. *Yersinia* genus and yersiniosis. *Vibrio* genus and vibriosis. *Campylobacter* genus and campylobacteriosis.
8. Mycotoxigenic fungi and mycotoxins.
9. Foodborne Viruses and parasites.
10. Microorganisms in fresh meats and poultry. Microorganisms in processed meats and seafoods.
11. Microorganisms in milk, fermentation, and fermented and nonfermented dairy products.
12. Microorganisms in vegetable and fruit and in their products. Microorganisms in soft drinks and bottled waters.
13. Microorganisms in cereals and bakery products, sugars, candies.
14. Microorganisms in spices, oil rich seeds, coffee, tea, herbs. Microorganisms in cans and RDE, RDU products.

Type of mid-term examination:
Participation at the practice. Fulfill Practice requirements.

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): colloquium examination

Teaching aids: Lecture and practice ppt slides

Recommended literature:
Jay, J. M., Loessner, M. J., Golden, D. A. (2005): Modern Food Microbiology. ISBN 978-0-387-23413-7
Adams, M. R., Moss M. O. (2008): Food Microbiology. The Royal Society of Chemistry. ISBN 978-0-85404-284-5
Karaffa E., Peles F (2014): Microbiological Aspects of Food Quality And Safety. Debreceni Egyetem, Debrecen.
Madigan, M. T, Martinko, J. M., Bender K., Buckley, D., Stahl, D (2015): Brock Biology of Microorganisms, Benjamin Cumming, 14th edition 1030 oldal, ISBN 978-1-292-01831-7

REQUIREMENTS
2021/2022. academic year II. semester

Name and code of the subject: Élelmiszerminőség és élelmiszerlánc-biztonság (Food quality and food chain safety), MTMAL7011A
Name and title of the person responsible for the subject: Dr. Nikolett Czipa, associate professor
Additional instructors involved in teaching the subject: Loránd Alexa, assistant lecturer,
Name and level of the program: Animal Husbandry Engineering MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 2+2, examination
Credit value of the subject: 4

Purpose of teaching the subject: The main aim of the lectures is to know the physical, chemical and biological/microbiological hazards which have important effects on food safety and food quality. In this semester, students will know the methodology of risk analysis (mainly the risk assessment) and the methodology of the determination of tolerable intakes and other toxicological values. Student will know the methodology of hazard analysis relation to animal origin food production.

Content of the subject (14 weeks):

1. European food safety policy, ÉLBS, Regulation No. 178/2002/EC
2. Influencing factors of food safety
3. Introduction to toxicology, determination of safe human dose, human exposure assessment
4. Microbiological hazards, foodborne diseases, vulnerable groups
5. Chemical hazards
6. Risk management framework (RMF)
7. Hazards of genetically modified plants and foods
8. Labelling of food, geographical indicators and trade marks
9. Introduction to HACCP, HACCP handbook
10. Hazard analysis of animal origin foods (milk and dairy products)
11. Hazard analysis of animal origin foods (meat products)
12. Authorization of food business, penalties
13. Food trade in the EU, border control of food from third countries
14. Case studies

Type of mid-term examination: Attendance in the case of practical courses is compulsory. The acceptable extent of absences is 3 practical courses / semester. The Students have three tests in the session. At least 60% is required to satisfactory mark. If the Student fails to fulfil this we provide an occasion to repeat it in the educational period. Should the student fail this occasion as well, a new occasion must be offered until the end of the third week of the exam period to repeat the mid-term exam.
Criterion of signature: Active attendance on the practical courses.

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): examination

Teaching aids: Slides of lectures

Recommended literature:
IPCS (2010): WHO human health risk assessment toolkit: chemical hazards. ISBN: 978-92-4-154807-6
2016/C 278/01 EU Commission notice on the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation/flexibility of the implementation in certain food businesses
Codex Alimentarius Commission: Food hygiene. Basic texts. (http://www.fao.org/docrep/012/a1552e/a1552e00.pdf)
Regulations, directives, standards

REQUIREMENTS
2021/22 academic year2. semester

Name and code of the subject: Quality control and quality management MTMEL7012A
Name and title of the person responsible for the subject: Tünde Pusztahelyi PhD, associate professor
Additional instructors involved in teaching the subject: -
Name and level of the program: Food Safety and Quality Engineering, MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 2+1 K
Credit value of the subject: 4

Purpose of teaching the subject: The course covers the concept and importance of quality, the historical background, the concept of quality assurance. Development of quality management, evolvement of total quality management from the quality checking of the manufactures. Quality tools and techniques are also discussed and are the main topics of the practice. LEAN as main goal and practice with its tools in industry is also presented. Audit of the quality control systems and the accreditation techniques as well as quality assurance in laboratory are covered.

Content of the subject (14 weeks):

week	Lecture	Practice
1.	The concept of quality, process elements of quality, external and internal factors of quality.	Root cause analysis – Fishbone diagram
2.	Edward Deming's philosophy. Quality management plan (PDCA cycle)	Root cause analysis -5 Why method, Affinity diagram Flowcharting
3.	Economic aspects of quality management. Cost of quality (Feigenbaum), Process-cost. Quality controlling.	Check sheet
4.	The Japanese philosophy: kaizen. KAIZEN tools.	Histogram
5.	Total quality management. Kaizen in TQM in ISO 9000.	Pareto diagram and ABC diagram
6.	Process-orientation and process control	FMEA
7.	Standardization, system management standards.	Scatter plot
8.	Project-management.	Control charts
9.	LEAN. LEAN tools: six sigmas, DMAIC, value stream mapping	Force field analysis
10	Good Laboratory Practice	Gantt diagram
11	Accreditation techniques	Matrix of competence
12	Metrology. Measurement and control of measurement by the ISO 9000 standards	5S method and self-test

13	Calibration and validation. Characteristics and formality of quality assurance of analytics.	Laboratory equipment
14	Legal aspects of quality management. Warranty, product liability, certification of product safety, compliance. Contracts.	Break-even analysis

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Type of mid-term examination: -

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): oral/writing exam, practical assignements

Teaching aids:
ppt presentation

Recommended literature:

1. Pojasek: Lean, Six Sigma, and the Systems Approach: Management Initiatives for Process Improvement Environmental Quality Management, 13 (2), 2003.
2. Soković et al. (2009): Basic Quality Tools in Continuous Improvement Process Journal of Mechanical Engineering 55, 5
3. Pusztahelyi, T. (2019) Practical exercises for the Course "Quality control, quality management" handout. EFOP-3.4.3-16-2016-00021

4. REQUIREMENTS

5. 2021/22 academic year II. semester

6.

7. Name and code of the subject: Radiological food testing MTMEL7019A

8. Name and title of the person responsible for the subject: Dr. Prokisch József, associate professor

9. Additional instructors involved in teaching the subject:

10. Name and level of the program: Food safety and quality engineering, MSc

11. Subject type: Compulsory

12. Teaching timetable of the subject, type of examination: 2+1

13. Credit value of the subject: 3

14.

15. Purpose of teaching the subject:

16. The aim of the subject is to get to know the sources, measurement and effect of radioactive contamination of food. Students will learn about the types of ionizing radiation, the occurrence and measurement of radioactive isotopes, and the applications of the results. They learn about the possibilities of treating foods with ionizing radiation.

17. Content of the subject (14 weeks):

18.

19. The aim of the subject is to get to know the sources, measurement and effect of radioactive contamination of food. Students will learn about the types of ionizing radiation, the occurrence and measurement of radioactive isotopes, and the applications of the results. They learn about the possibilities of treating foods with ionizing radiation.
20. The topics of the lectures are as follows:
21. 1. History of radioactivity, basic concepts
22. 2. Radioactive isotopes, radiations, laws of radioactive decay
23. 3. Forms of decay, radiation, Arrays of decay, Artificial radioactivity, Neutron radiation, Other particles in radiation, Nuclear fission (induced), Spontaneous fission

24. 4. Measurement of radioactive radiation, Interaction of radiation with matter, Detectors, Measuring instruments and their characteristics, Dosimetry of ionizing radiation
25. 5. Dose Concepts, Dose Quantities and Units, Absorbed Dose, Equivalent, Effective Dose, Dose Measurement
26. 6. Chemical, biological and health effects of ionizing radiation, Physical and chemical effects of radiation, Biological effects of radiation, Cellular effects of radiation, Radiation damage to tissues, organs and the human body, Deterministic and stochastic radiation exposure, Detection of radiation diseases
27. 7. Radiation protection, Limit values, Food activity in the event of a nuclear emergency, Management of radioactive materials
28. 8. Radiation health aspects of medical interventions, Diagnostics, Screening techniques, Radioisotope procedures, Therapy, Special radiation protection problems for medical applications,, Management of special events and emergencies
29. 9. Emergency levels for the general population, Radiations of natural origin, radiation exposure, Cosmogenic radionuclides, Radiations in the Earth's crust, Limits and regulations related to radiation of natural origin, Radiations of artificial origin, radiation exposure
30. 10. Nuclear Accidents, The Three Mile Island Accident, Chernobyl, Tokai Mura, Fukushima, Weapons Accidents
31. 11. The role of nuclear energy in energy production, Nuclear power plants and their environmental impacts, Brief history of nuclear power plants, operating principle, Types of nuclear power plants, Decommissioning of nuclear power plants
32. 12. Examination of radiation of foodstuffs
33. 13. Treatment of foodstuffs with ionizing radiation
34. 14. Neutron activation analysis
35. During the exercises we will visit the gamma-sterilization plant of Dispomedicor, the ATOMKI cyclotron, we will get acquainted with the fog chamber in the Agora and we will perform basic measurements. Students present published topics in the framework of lectures
36.
37. **Type of mid-term examination:**
38. student lectures on an isotope
39.
40. **Method of assessment (semester examination mark - report, practical grade, colloquium, examination):**
41. written or oral exam at the end of the year
42. **Teaching aids:**
43. Theoretical summary word file, educational films
44. **Recommended literature:**
45. Natural and induced radioactivity in food Food and Environmental Protection Section International Atomic Energy Agency Wagramer Strasse 5 P.O. Box 100 A-1400 Vienna, Austria https://www-pub.iaea.org/MTCD/Publications/PDF/te_1287_prn.pdf

46. REQUIREMENTS

47. 2021/22 academic year II. semester

48.
49. **Name and code of the subject:** Rapid analytical and microbiological methods, MTMELL7020
50. **Name and title of the person responsible for the subject:** Dr. Prokisch József, associate professor
51. **Additional instructors involved in teaching the subject:** Dr. Karaffa Erzsébet Mónika, Pál Károly
52. **Name and level of the program:** MSc in Food Safety and Quality Engineering

53. Subject type: compulsory
54. Teaching timetable of the subject, type of examination: 2+2, practical examination+written exam
55. Credit value of the subject: 3
56.
57. Purpose of teaching the subject:
58. The aim of teaching the subject is to provide up-to-date knowledge that enables the student to become acquainted with non-destructive electroanalytical, spectroscopic and other optical analytical methods that can be used in the analytical and microbiological examination of food. Learn about various microbiological rapid tests, automated testing procedures, the principles of chemical and physical-based microbiological methods, and their food microbiological applications. After learning about the principles of microbiological methods that can be performed using immunological and molecular biological methods, the implementation and use of the most important methods will be reviewed.
59. Students will be able to select and implement an appropriate rapid method for analytical and microbiological parameters important in food testing.
60.
61. Content of the subject (14 weeks):
62. 1. Electroanalytical methods: Potentiometry, Coulombmetry
63. 2. Electroanalytical methods: Conductometry, Voltammetry
64. 3. Spectrometric methods: Infrared spectrophotometry
65. 4. Spectrometric methods: Nuclear magnetic resonance spectroscopy; Radiochemical
66. methods: Activation analysis
67. 5. Refractometry
68. 6. Polarimetry
69. 7. Chromatographic methods: Thin layer chromatography
70. 8. Automation of conventional microbiological operations
71. 9. Rapid tests used in hygiene tests
72. 10. Rapid microbiological methods based on the measurement of physical parameters.
73. 11. Rapid microbiological methods based on the detection of microbial metabolites.
74. 12. Immunological methods.
75. 13. Hybridization techniques
76. 14. Polymerase Chain Reaction (PCR) Methods and Molecular Fingerprint Methods
77. ...
78.
79. Type of mid-term examination: -
80.
81. Method of assessment (semester examination mark - report, practical grade, colloquium, examination): practical grade
82.
83. Teaching aids:
84. slides of the lectures
85.
86. Recommended literature:
87.
88. Patel P. (1995): Rapid analysis techniques in food microbiology. Springer Science+Busieness Media Dordrecht
89.

REQUIREMENTS
2021/2022. academic year II. semester

Name and code of the subject: Élelmiszerminőségi és biztonsági kockázatelemzés (Food quality and safety risk analysis), MTMEL7021A
Name and title of the person responsible for the subject: Dr. Nikolett Czipa, associate professor
Additional instructors involved in teaching the subject: Loránd Alexa, assistant lecturer
Name and level of the program: Food Safety and Quality Engineering MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 3+2, examination
Credit value of the subject: 5

Purpose of teaching the subject: The main aim of the lectures is to know the physical, chemical and biological/microbiological hazards which are important effect to the food safety and food quality. The student will know the different foodborne diseases that are caused by different bacteria and parasites. In this semester the student will know the methodology of risk analysis (mainly the risk assessment) and the methodology of determination of tolerable intakes and other toxicological values.

Content of the subject (14 weeks):

1. Introduction to food safety, European food safety policy, ÉLBS, food law (Regulation No. 178/2002/EC)
2. Influencing factors of food chain safety
3. Chemical hazards
4. Microbiological hazards
5. Vulnerable groups, foodborne diseases
6. Introduction to toxikology, dose-response analysis, determination of safe human dose
7. Human exposure assessment
8. Introducion to risk analysis
9. Risk management and risk communication
10. Risk assessment
11. Chemical risk assessment
12. Introduction to biotechnology, risks of genetically modified plants
13. Risk assessment of genetically modified foods
14. Risk ranking

Type of mid-term examination: Attendance in the case of practical courses is compulsory. The acceptable extent of absences is 2 practical courses / semester. The Students have nine tests in the session (on every lecture). At least 60% is required to satisfactory mark. If the Student fails to fulfil this we provide an occasion to repeat it in the educational period. Should the student fail this occasion as well, a new occasion must be offered until the end of the third week of the exam period to repeat the mid-term exam.

Criterion of signature: Active attendance on the practical courses and presentation of an individual project task.

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): examination

Teaching aids: Slides of lectures

Recommended literature:
WHO (2000): Human Exposure Assessment (Environmental Health Criteria; 214). Geneva, Switzerland
WHO (2010): WHO Human Health Risk Assessment Toolkit: Chemical Hazards. Geneva, Switzerland
Tulve et al. (2016): Guidelines for Human Exposure Assessment. U.S. EPA

REQUIREMENTS
2021/2022 academic year II semester

Name and code of the subject: Rheology in food testing, MTMEL7022A
Name and title of the person responsible for the subject: Dr. Diána Ungai, assistant lecturer
Additional instructors involved in teaching the subject:
Name and level of the program: Food Safety and Quality Engineering MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 1+1 K
Credit value of the subject: 3

Purpose of teaching the subject:
The aim of this subject is to present the basic elements of rheology. It presents the aims of rheology and the general properties of elastic and viscous deformation. It presents the connections of stress and deformation in details and the connecting principles, the basic models of different rheological systems (Kelvin, Maxwell and other). The measurement of rheological properties – rheometry. The general rheometric methods (capillary viscometers, rotational viscometers, rheometers, texture analysis). At the end, selected food groups are presented by their rheological behaviour and their special rheometric methods are also discussed .

Content of the subject (14 weeks):

1. Aim of rheology
2. The elastic and viscous deformation.
3. Connections of stress and deformation. Superposition principles
4. Elastic deformations and modulus. Shearing stress and viscosity
5. Rheological models (Kelvin, Maxwell, Burgers model)
6. Rheometry: Capillary viscometers, Rotational viscometers, Rheometers
7. Force measurement methods
8. Distance, time and ratio measurements
9. Texture analysis – aims, types
10. Rheological methods in cereal analysis
11. Farinograph
12. Hagberg falling number
13. Viscosity
14. Rheological methods in fruit analysis

Type of mid-term examination: To give presentation from the choosen topic. This is the requirement to get signature in the semester.

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): colloquim

Teaching aids: ppt presentations

Recommended literature:

1. Kent K. Stewart-John R. Whitaker (1984): Modern Methods of Food Analysis. Avi Publishing Company, INC Westport, Connecticut. ISBN: 978-94-011-7381-0
2. Marwaha, K. (2010): Control and Analysis for Food and Agricultural Products. Gene-Tech Books New Delhi India. 664. 272 p. ISBN 978-81-89729-93-6
3. Sipos, P. (2013): Quality analysis of Agricultural Products. University of Debrecen. ISBN:978-963-473-660-8

REQUIREMENTS
2021/2022. academic year 2. semester

Name and code of the subject: Molecular Biology Methods for Food Authentication MTMEL7034A
Name and title of the person responsible for the subject: Dr. Czeglédi Levente professor
Additional instructors involved in teaching the subject:
Name and level of the program: Food Safety and Quality MSc.
Subject type: optional
Teaching timetable of the subject, type of examination: 1+1 K
Credit value of the subject: 3

Purpose of teaching the subject: The students of the course will have a complex knowledge that focuses on the proof of origin that defines consumer protection. Students will learn the basics of molecular genetics, will be able to interpret species identification methods based on DNA tests, protein / peptide analysis, and fatty acid composition methods. Get to know the current limitations and the potential of different approaches to prove the origin of animal derived food and food products.

Content of the subject (14 weeks):

1. Basics of molecular genetics
2. Genetic inheritance, genetic structure of the population
3. The occurrence, importance and types of mutations
4. The genome
5. Biotechnics - Biotechnology
6. Methods to detect the species in animal derived foodstuffs
7. Genetic Methods I.
8. Genetic Methods II.
9. Quantitative genetic methods
10. Authentication techniques based on DNA conformation and melting point
11. Practical solutions with DNA-based food tests

12. Proteomics and protein assay methods for species identification
13. Fats, fatty acids, fatty accid composition of animal products
14. Authentication by Fatty Acid Analysis

Type of mid-term examination: -

Method of assessment (semester examination mark - report, practical grade, colloquium, examination): written exam

Teaching aids: ppt files

Recommended literature:

Safdara M., Junejo Y. (2016): The development of a hexaplex-conventional PCR for identification of six animal and plant species in foodstuffs. Food Chemistry. 192. 745-749.
Kitpipit T., Sittichan K., Thanakiatkrai P. (2014): Direct-multiplex PCR assay for meat species identification in food products. Food Chemistry. 163. 77-82.
Montowska M., Pospiech E. (2013): Species-specific expression of various proteins in meat tissue: Proteomic analysis of raw and cooked meat and meat products made from beef, pork and selected poultry species. Food Chemistry 136. 1461–1469.
Gaspardo B., Lavrencic A., Levart A., Del Zotto S., Stefanon B. (2010): Use of milk fatty acids composition to discriminate area of origin of bulk milk. Dairy Sci. 93. 3417-26.
Indrasti D., Man Y. B. C., Mustafa S., Hashim D. M. (2010): Lard detection based on fatty acids profile using comprehensive gas chromatography hyphenated with time-of-flight mass spectrometry. Food Chemistry, 122. 4. 1273-1277.