REQUIREMENTS
2017-2018 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
2017/2018 academic year II. semester

Name and code of the subject: Quality system audit. MTMEE024
Name and title of the person responsible for the subject: Dr. Ferenc Peles, assistant 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+1 C
Credit value of the subject: 3

Purpose of teaching the subject: The aim of the subject is the introduction of the audit standard, the planning and implementation of management systems audit, furthermore learn about the audit techniques.

Content of the subject (14 weeks):

1. Introduction. Definitions.
2. The place of audit in the operation of management systems
3. Principles of auditing
4. Establishment and operation of an audit team
5-6. Aspects of preparing the audit program
7. Implementation and management of audit programs
8-9. Characteristics of audit activities
10-11. Requirements for auditors
12-13. Audit techniques
14. Main aspects related to the audit of quality management systems

Type of mid-term examination: mid-year written exams

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

Teaching aids: PPT slides

Recommended literature:
Peles, F. – Juhász, Cs. (2014): Quality assurance. University lecture notes. University of Debrecen. /ISBN 978-963-473-656-1/ TÁMOP 4.1.2.A/1-11/1-2011-0009. 177p.
Vasconcellos, J.A. (2004): Quality Assurance for the Food Industry. A Practical Approach. CRC Press. 448 p.
Jacxsens, L. – Devlieghere, F. – Uyttendaele, M. (2009): Quality Management Systems in the Food Industry. Ghent University. 153p.

REQUIREMENTS
2017/18. academic year 2 nd semester

Name and code of the subject: Packaging technology, MTMEE026
Name and title of the person responsible for the subject: Prof. Dr. Béla Kovács, professor
Additional instructors involved in teaching the subject: Éva Bacskiné Dr. Bódi
Name and level of the program: Food Safety and Quality Engineering MSc, 1.
Teaching timetable of the subject, type of examination: 2+0, exam
Credit value of the subject: 2

Purpose of teaching the subject:
The types of packaging materials (textiles, wood, metal, glass, paper and plastic), pairing possibilities knowledge. The quality of the packaging and reliability. Packaging machines and devices. packaging environmental impact of materials, re-processability. Food and packaging interaction (diffusion and migration). The food commodity marking (labeling). Mandatory and voluntary labeling (use of information and advertising).

Content of the subject (14 weeks):

1. Packing elements (basic concepts, aims and tasks of the pack)
2. Packaging Training (consumer and multipack packaging)
3. Paper (sachets, bags, sacks, carton boxes)
4. Metal packaging products (coated and zinc plated steel plate, aluminum foil, trays, tubes and barrels)
5. plastics-based packaging products (hermoplastics and hardening plastics films, plates, boxes, hollow objects)
6. Glass containers (narrow and wide-mouth jars and closing their methods)
7. Wood packing materials
8. Textiles packing materials
9. Combined packaging supplies
10. Vacuum and modified atmosphere packaging
11. Dangerous goods packaging
12. Cargo handling markings, signs
13. Packaging and the environment protection
14. The food and packaging materials interaction

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:

Richard Coles, Derek McDowell, Mark J. Kirwan: 2003. Food packaging technology. CRC Press, London. 346 p. ISBN 9780849397882.
Dong Sun Lee, Kit L. Yam, Luciano Piergiovanni: 2008. Food Packaging Science and Technology. CRC Press, London. 656 p. ISBN 9780824727796.
Gordon L Robertson: 2013. Food Packaging Principles and Practice. CRC Press, London. 686 p. ISBN 9781439862421.

REQUIREMENTS
2017/18. tanév II. félév

A tantárgy neve, kódja: Microbiological aspects of food quality and safety, MTMEE008
A tantárgyfelelős neve, beosztása: Dr. Karaffa Erzsébet Mónika, egyetemi docens
A tantárgy oktatásába bevont további oktatók: Dr. Pál Károly, tudományos főmunkatárs
Szak neve, szintje: Élelmiszerbiztonsági és –minőségi mérnöki, MSc
Tantárgy típusa: kötelező
A tantárgy oktatási időterve, vizsga típusa: 2+2, K
A tantárgy kredit értéke: 4

A tárgy oktatásának célja:
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.

A tantárgy tartalma (14 hét bontásban):

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

Évközi ellenőrzés módja: a gyakorlatokon való részvétel kötelező. A gyakorlatok 70%-án való részvétel kötelező. A gyakorlatokhoz kapcsolódóan jegyzőkönyvet kell leadni a hallgatónak.
Számonkérés módja (*félévi vizsgajegy kialakításának módja – beszámoló, gyakorlati jegy, kollokvium, szigorlat*): kollokvium

Oktatási segédanyagok: az előadások diasorai

Ajánlott irodalom:

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
2017/18. 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
Additional instructors involved in teaching the subject: Szilvia Várallyay, Áron Soós
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
2017/2018 academic year II. semester

Name and code of the subject: Traceability in the food chain. MTMEE022
Name and title of the person responsible for the subject: Dr. Ferenc Peles, assistant 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+1 C
Credit value of the subject: 2

Purpose of teaching the subject: The purpose of this subject is to familiarize the student with the concepts, basics and objectives of traceability, regulations and standards related to traceability, furthermore the tracing and tracking techniques in practice.

Content of the subject (14 weeks):

1. Introduction. Definitions.
2. The relationship between the food chain safety and traceability
3. Aims, significance and benefits of traceability
4. Types of tracing procedures and their characteristics
5. Regulations and standards related to food traceability
6. Follow-up systems in case of plant origin foods
7. Follow-up systems in case of animal origin foods
8. TIR and ENAR system
9. GS1 system
10. GS1 standards
11. Types of bar codes and their characteristics.
12. RFID system
13. Application of RFID technology in traceability
14. Design and implementation of a traceability system

Type of mid-term examination: mid-year written exams

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

Teaching aids: PPT slides

Recommended literature:
Schiffers, B. (2011): Traceability. COLEACP-PIP programme, training manual 2. 118 p.
Regulation (Ec) No 178/2002 of The European Parliament and of The Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
Commission Implementing Regulation (EU) No 931/2011 of 19 September 2011 on the traceability requirements set by Regulation (EC) No 178/2002 of the European Parliament and of the Council for food of animal origin
ISO 22005:2007. Traceability in the feed and food chain. General principles and basic requirements for system design and implementation.

REQUIREMENTS
2017/18. academic year 2 nd semester

Name and code of the subject: Modern methods of food analysis I., Spectroscopy MTMEE002
Name and title of the person responsible for the subject: Prof. Dr. Béla Kovács, professor
Additional instructors involved in teaching the subject: -
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: 1+4, exam
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):

Lecture 1: Methods of sampling and sample preparation. Preservation of samples. Possible errors.
Lecture 2: General description of spectroscopic methods
Lecture 3: Emission spectroscopy, flame emission spectroscopy (FES)
Lecture 4: Flame atomic absorption spectrometry (FAAS)
Lecture 5: Graphite furnace atomic absorption spectrometry
Lecture 6: Inductively coupled plasma optical emission spectrometry (ICP-OES)
Lecture 7: Mass spectrometry. Inductively coupled plasma mass spectrometry (ICP-MS)
Lecture 8: Comparison and applicability of these analytical methods.
Lecture 9: UV/VIS photometry. Instruments, methods, applications. Flow injection analysis (FIA).
Lecture 10: Infra red spectroscopy.
Lecture 11: Atomic fluorescence spectroscopy
Lecture 12: X-ray fluorescence, gamma spectrometry, ionizer radiations.
Lecture13: Electron spin-resonance spectroscopy, nuclear magnet resonance spectroscopy.

Topics of laboratory practices

Practice 1: Education about work safety, fire protection
Practice 2-3: Sampling of food and food raw materials, sample preparation for element speciation
Practice 4: Determination of sodium and potassium content of food and food raw material samples by FES.
Practice 5-6: Determination of zinc and copper content of food and food raw material samples by FAAS.
Practice 7-8: Determination of cadmium and lead content of food and food raw material samples by GFAAS.

Practice 9-10: Multielement analysis (Na, K, Cu, Zn, S, P, Ca, Mg, Mn) of food and food raw material samples by ICP-OES.
Practice 11-12: Multielement analysis (Cu, Zn, Mn, As, Se, Cd, Pb) of food and food raw material samples by ICP-MS.
Practice 13-14: Multielement analysis of food and food raw material samples applying inner standard standard addition by ICP-OES and ICP-MS.

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 grade 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:

Boss, C. B. & Fredeen, K. J., 1997. Concepts, instrumentation, and techniques in inductively coupled plasma optical emission spectrometry. Perkin Elmer. USA.
Cresser, M. S., 1994. Flame spectrometry in environmental chemical analysis. The Royal Society of Chemistry. Cambridge.
Montaser, A. & Golightly, D. W., 1987. Inductively coupled plasmas in analytical atomic spectrometry. VCH Publishers. New York.
Montaser, A. 1998. Inductively coupled plasmas mass spectrometry. VCH Publishers. New York.

REQUIREMENTS
2017/2018. tanév II. félév

A tantárgy neve, kódja: Logistics in food chain, MTMEE025
A tantárgyfelelős neve, beosztása: Dr. Pakurár Miklós, egyetemi docens
A tantárgy oktatásába bevont további oktatók: Horváth Adrienn, ügyvivő-szakértő
Szak neve, szintje: Élelmiszerbiztonsági és -minőségi mérnöki MSc angol nyelven
Tantárgy típusa: kötelező
A tantárgy oktatási időterve, vizsga típusa: 2+0 K
A tantárgy kredit értéke: 2

A tárgy oktatásának célja: The aim of the course is to make students understand the logistical processes of a food producing enterprise. Desingning, managing, controling and improving logistic processeses are the center of the subject.

A tantárgy tartalma (14 hét bontásban):

1. Operational strategy - competitiveness
2. Design of products and services
3. Process planning
4. Facilities
5. Supply chain management
6. Inventory management
7. Peculiarities of the food industry, Lean production
8. Teamwork, Measuring and quantifying performance
9. Workplace organization in the food industry
10. Improving flexibility and responsiveness
11. Process and Product Development, Activity Planning
12. Pre-shift meetings, Seven losses in the food industry
13. Improving the operation of machines, Motivating people,
14. Measuring business performanceÉvközi ellenőrzés módja: Nincs.

Évközi ellenőrzés módja: Nincs.

Számonkérés módja *(félévi vizsgajegy kialakításának módja – beszámoló, gyakorlati jegy, kollokvium, szigorlat):* kollokvium

Oktatási segédanyagok: PPT.

Ajánlott irodalom: Dudbridge, M. (2011): Handbook of Lean Manufacturing in the Food Industry, Wiley-Blackwell, ISBN: 978-1-4051-8367-3; 1-231 p.

REQUIREMENTS
2017/2018. academic year II. semester

Name and code of the subject: Medicinal plants and their processing, MTMEE029
Name and title of the person responsible for the subject: Dr. Erika Tünde Kutasy, assistant professor
Additional instructors involved in teaching the subject:
Name and level of the program: Food Safety and Quality, MSc
Subject type: compulsory
Teaching timetable of the subject, type of examination: 1+3 C
Credit value of the subject: 2

Purpose of teaching the subject:
The aim of the course is to give informations about the significance of medicinal and aromatic plants production in Hungary and in the world. Uses of medicinal plants. Classification of medicinal plants. Active ingredients of medicinal plants. Quality assurance of drugs. The production technologies of the most important herb species in Hungary. Wild collection of medicinal plants. The most important wild-harvested herbs in Hungary. Primary processing of medicinal and aromatic plants.

Content of the subject (14 weeks):
1. Medical plant production in Hungary and in the world. Agroecological conditions of production. Drugs and their systematization.
2. Genetical background of medical and spice crops farming. Gathering of medical plants.
3. General and specific methods of production technology of medicine and aromatic plants.
4. Possibilities and practice of aromatic plant production in organic farming.
5. Processing and storing of medical and aromatic crops, extraction of active substances.
6. Qualifying of herbs.
7. Production of annual herbs: (Claviceps purpurea, Coriandrum sativum, Anethum graveolens, Carum carvi).
8. Majorana hortensis, Pimpinella anisum, Ocimum basilicum production
9. Satureja hortensis, Matricaria chamomilla, Calendula officinalis production
10. Production of biennial herbs: (Foeniculum vulgare, Digitalis lanata, Digitalis purpurea, Salvia sclarea).
11. Production of perennial herbs: (Mentha piperita, Lavandula angustifolia, Melissa officinalis).
12. Hyssopus officinalis, Thymus vulgaris, Levisticum officinale production.
13. Valeriana officinalis, Salvia officinalis production.
14. Papaver somniferum production.

Type of mid-term examination:
- Completing assignments
- Giving a short presentation

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

Teaching aids: lecture material

Recommended literature:
Hornok, L. (1992) Cultivation and Processing of Medicinal Plants. John Wiley & Sons Ltd, Baffins Lane, Chicester, UK 338. p. ISBN 0-471-92383-4
WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants. World Health Organization Geneva (2003)

KÖVETELMÉNYRENDSZER
2017/18. tanév II. félév

A tantárgy neve, kódja: Élelmiszer minőség és biztonság mikrobiológiai vonatkozásai, MTMEL009
A tantárgyfelelős neve, beosztása: Dr. Karaffa Erzsébet Mónika, egyetemi docens
A tantárgy oktatásába bevont további oktatók: Dr. Peles Ferenc, egyetemi adjunktus, Dr. Pál Károly, tudományos főmunkatárs
Szak neve, szintje: Élelmiszerbiztonsági és –minőségi mérnöki, MSc
Tantárgy típusa: kötelező
A tantárgy oktatási időterve, vizsga típusa: 2+2, Gy
A tantárgy kredit értéke: 4

A tárgy oktatásának célja:
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.

A tantárgy tartalma (14 hét bontásban):
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.

Évközi ellenőrzés módja: a gyakorlatokon való részvétel kötelező. A gyakorlatok 70%-án való részvétel kötelező. A gyakorlatokhoz kapcsolódóan jegyzőkönyvet kell leadni a hallgatónak. Az aláírás megszerzésnek feltétele a gyakorlatokon való részvétel.

Számonkérés módja (*félévi vizsgajegy kialakításának módja – beszámoló, gyakorlati jegy, kollokvium, szigorlat*): gyakorlati jegy

Oktatási segédanyagok: az előadások diasorai

Ajánlott irodalom:

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
2017/18 academic year II. semester

Name and code of the subject: Minőségirányítás, minőségmenedzsment (Quality Control, 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: Diána Ungai, Ph.D.
Name and level of the program: Élelmiszerbiztonsági és –minőségi mérnöki (Food Safety and Quality Engineering) MSc
Subject type: kötelező (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):
1. Legal aspects of quality management. Warranty, product liability, certification of product safety, compliance. Contracts.
2. The concept of quality, process elements of quality, external and internal factors of quality. Crosby's quality absolutes. Juran's quality planning pathway.
3. Edward Deming's philosophy. Quality management plan (PDCA cycle)
4. Economic aspects of quality management. Cost of quality (Feigenbaum), Process-cost. Quality controlling.
5. The Japanese philosophy: kaizen. KAIZEN tools.
6. Total quality management. Kaizen in TQM in ISO 9000.
7. Process-orientation and process control
8. Standardization, system management standards. Elements of quality management.
9. Project-management.
10. LEAN. LEAN tools: six sigmas, DMAIC, value stream mapping
11. Good Laboratory Practice
12. Accreditation techniques.
13. Metrology. Measurement and control of measurement by the ISO 9000 standards.
14. Calibration and validation. Characteristics and formality of quality assurance of analytics.

Practical:
1. Root cause analysis -5 Why method, Flowcharting
2. Root cause analysis – Fishbone diagram
3. Root cause analysis – Affinity diagram
4. Check sheet
5. Histogram
6. Pareto diagram and ABC diagram
7. Gantt diagram
8. Scatter plot

9. Control charts
10. Force field analysis
11. Break-even analysis
12. Matrix of competence
13. FMEA
14. 5S method and self-test

Type of mid-term examination:
Condition for obtaining a signature are participating in the practical classes and submitting the assignments.

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

Teaching aids: -

Recommended literature:
Peles, Juhász: Quality assurance.
Pojasek: Lean, Six Sigma, and the Systems Approach: Management Initiatives for Process Improvement Environmental Quality Management, 13 (2), 2003.
Soković et al.: Basic Quality Tools in Continuous Improvement Process Journal of Mechanical Engineering 55, 5(2009)

REQUIREMENTS
2017/18. academic year 2 nd semester

Name and code of the subject: Packaging technology, MTMEL7030A
Name and title of the person responsible for the subject: Prof. Dr. Béla Kovács
Additional instructors involved in teaching the subject: Éva Bacskainé Dr. Bódi
Name and level of the program: Food Safety and Quality Engineering MSc, 1.
Teaching timetable of the subject, type of examination: 2+0, exam
Credit value of the subject: 3

Purpose of teaching the subject:
The types of packaging materials (textiles, wood, metal, glass, paper and plastic), pairing possibilities knowledge. The quality of the packaging and reliability. Packaging machines and devices. packaging environmental impact of materials, re-processability. Food and packaging interaction (diffusion and migration). The food commodity marking (labeling). Mandatory and voluntary labeling (use of information and advertising).

Content of the subject (14 weeks):

1. Packing elements (basic concepts, aims and tasks of the pack)
2. Packaging Training (consumer and multipack packaging)
3. Paper (sachets, bags, sacks, carton boxes)
4. Metal packaging products (coated and zinc plated steel plate, aluminum foil, trays, tubes and barrels)
5. plastics-based packaging products (hermoplastics and hardening plastics films, plates, boxes, hollow objects)
6. Glass containers (narrow and wide-mouth jars and closing their methods)
7. Wood packing materials
8. Textiles packing materials
9. Combined packaging supplies
10. Vacuum and modified atmosphere packaging
11. Dangerous goods packaging
12. Cargo handling markings, signs
13. Packaging and the environment protection
14. The food and packaging materials interaction

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:

Richard Coles, Derek McDowell, Mark J. Kirwan: 2003. Food packaging technology. CRC Press, London. 346 p. ISBN 9780849397882.
Dong Sun Lee, Kit L. Yam, Luciano Piergiovanni: 2008. Food Packaging Science and Technology. CRC Press, London. 656 p. ISBN 9780824727796.
Gordon L Robertson: 2013. Food Packaging Principles and Practice. CRC Press, London. 686 p. ISBN 9781439862421.