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| **Title** of the subject:  **Traceability in the food chain MTMEL7017A** | **ECTS Credit Points: 3** |
| **Type** of the subject: compulsory / optional | |
| **Ratio of theory and practice: 50/50** (credit%) | |
| **Type and number of classes per semester**: 14 hour(s) lecture and 14 hour(s) practice per **semester.** Number of teaching hours / week: 1+1 (lecture and practice) | |
| **Type of exam**: exam / practical course mark | |
| **Subject in the curriculum:** semester 3 | |
| Preliminary requirements:- | |

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| **Summary of content - theory**: |
| Course objectives:  The aim of the subject is the introduction of the standards, furthermore, the development, operation and certification of quality, environmental and food safety systems.   1. Introduction. Definitions. The relationship between the food chain safety and traceability 2. Aims, significance and benefits of traceability 3. Types of tracing procedures and their characteristics 4. Regulations and standards related to food traceability 5. Follow-up systems in case of plant origin foods 6. Follow-up systems in case of animal origin foods 7. TIR and ENAR system 8. GS1 system and standards 9. Types of bar codes and their characteristics. RFID system |
| **Summary of content - practice**: |
| Skills to be learnt: Familiar with the follow-up techniques and their application in practice. Design and implement a traceability system.     1. Definitions, importance, objectives, types and principles of the traceability 2. Definitions, importance, objectives, types and principles of the traceability 3. GS1 system and standard 4. GS1 system and standard 5. Types and application of barcodes 6. Types and application of barcodes 7. Application of RFID technology in traceability 8. Application of RFID technology in traceability 9. Design and implementation of a traceability system |
| **Literature, handbooks in English** |
| 1. Schiffers, B. (2011): Traceability. COLEACP-PIP programme, training manual 2. 118 p. 2. 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 3. 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 4. ISO 22005:2007. Traceability in the feed and food chain. General principles and basic requirements for system design and implementation. |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * Familiar with the complexities of food safety and traceability and their legal regulatory background.  1. **Skills:**  * Able to implement, coordinate and operate traceability systems.  1. **Attitude:**  * Open, motivated and responsive to get to know and apply modern and innovative traceability procedures.  1. **Autonomy and responsibility:**  * Has responsibility towards the safety of food products that were produced with his/her contribution. |

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| **Responsible lecturer: Ferenc Peles, PhD** |
| **Other lecturer(s): -** |

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| **Terms of course completion:** |
| 1. Participating in the exercises 2. Completing practical exercises 3. Submitting practical essays 4. Giving presentation 5. Three mid-year written exams 6. Written exam (if the result of the mid-year written exams is less than 60%)   The course ends in a mid-semester grade based on the result of the mid-year written exams. The minimum requirement for both mid-term and end-term written exams is 60%.  Result and grade:  0-59%: fail (1)  60-69%: pass (2)  70-79%: satisfactory (3)  80-89%: good (4)  90-100%: excellent (5)  If the result of the written exams is below 60%, it is necessary to rewrite that. |
| **Form of examination:** |
| Written form |
| **Requirement(s) to get signature:** |
| 1. Participating in the exercises 2. Completing practical exercises 3. Submitting practical essays 4. Giving presentation |

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| **Exam questions:** |
| 1. Definitions, principles and objectives of traceability 2. Design of traceability system (ISO 22005:2007) 3. Implementation of traceability system (ISO 22005:2007) 4. Importance of the traceability 5. Advantages of traceability 6. Purposes and benefits of the traceability and identification 7. Essential elements of traceability 8. Problems, obstacles and limits of traceability and identifications 9. Traceability requirements 10. Factors affecting traceability 11. Consideration for effective traceability 12. Information requirement 13. Main driving forces for food traceability 14. Types of traceability 15. 4 principles of traceability 16. Standards related to food traceability 17. Regulations related to food traceability 18. Regulation (EC) No 1830/2003 – concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms 19. Commission Implementing Regulation (EU) No 208/2013 – on traceability requirements for sprouts and seeds intended for the production of sprouts 20. Regulation (EC) No 1169/2011 of the European Parliament and of the Council – on the provision of food information to consumers 21. Regulation (EC) No 178/2002. Article 14, 15, 17. 22. Regulation (EC) No 178/2002. Article 18, 19, 20. 23. Commission Implementing Regulation (EU) No 931/2011 on the traceability requirements set by Regulation (EC) No 178/2002 of the European Parliament and of the Council for food of animal origin 24. Characterization and history of GS1 (earlier EAN-UCC System) organization and system 25. What is the GS1 Traceability Standard? 26. What is the value and benefits of the GS1 Traceability Standard? What is the benefit for the consumers? 27. GS1 System of Standards 28. Fundamentals / core components of traceability 29. Data identification. GS1 identification keys 30. Traceability Data Management in production and in distribution 31. Data capture and management. GS1 Data Carriers. GS1-128. GS1 Application Identifier 32. Product hierarchy. Supply Chain Coordination. Batch / lot number 33. Traceability data within an organization. Traceability data across supply chains 34. Sources of traceability data + Example of internal and external data 35. GS1 Communication Standards + short characterization of them 36. Characterization of RFID and RFID-EPC. Main parts of the RFID identifier and RFID system 37. Characterization of the EPC and EPC/RFID tags 38. Types and characterization of RFID systems based on their energy supply 39. Types and characterization of RFID systems based on their frequency 40. Types and main characteristics of barcodes. Types of barcodes 41. Linear bar code symbols 42. GS1 DataBar. GS1 DataMatrix. QR code. MaxiCode. Composite Barcode. Bokode 43. Types and characterization of identification. Main types of identification 44. Requirements and possibilities of animal identification. Identification of animals 45. Biometric methods of animal identification. Examples of biometric identification methods 46. DNA based unique identification of animals 47. Traceability of food products of animal origin 48. Title and main content of the 1760/2000 EC regulation 49. Identification and registration of bovine animals (1760/2000 EC regulation, tiltle I) 50. Labelling of beef and beef products (1760/2000 EC regulation, tiltle II). Compulsory Community beef labelling system (1760/2000 EC regulation, section I) 51. National Animal Identification System 52. Main characteristics and legal basis of Rapid Alert System for Food and Feed (RASFF) 53. How does RASFF work? Types of RASFF notifications 54. Product recall |