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| **Course code** | CC7 |
| **Type and description** | CC7 - core curriculum for food technology and nutrition |
| **ECTS credit** | 1 |
| **Course name** | Modern microbiological analysis in food industry |
| **Course name in Polish** | Nowoczesna analiza mikrobiologiczna w przemyśle spożywczym |
| **Language of instruction** | English |
| **Course level** | 8 PRK |
| **Course coordinator** | dr hab. inż. Alina Kunicka-Styczyńska, prof. PŁ |
| **Course instructors** | dr hab. Katarzyna Rajkowska |
| **Delivery methods and course duration** | |  | **Lecture** | **Tutorials** | **Laboratory** | **Project** | **Seminar** | **Other** | **Total of teaching hours during semester** | | --- | --- | --- | --- | --- | --- | --- | --- | | Contact hours | 15 |  |  |  |  | 0 | 15 | | E-learning | No | No | No | No | No | No |  | | Assessment criteria (weightage) | 40,00 |  | 60,00 |  |  | 0,00 |  | |
| **Course objective** | The aim of the subject is a transfer of knowledge of modern technics in microbiological analysis applied in industrial practice of food and beverages production |
| **Learning outcomes** | After completing the subject a student:  1. can indicate the objectives and scope of the microbiological analysis in food production  2. is able to choose appropriate system of microbiological analysis to detect specific groups of microorganisms  3. applies instrumental analysis techniques used in microbiological analysis  4. learns independently in a targeted manner  5. demonstrates ability to work in a team |
| **Assessment methods** | Effects 1-2 – an open test  Effect 3 - reports of laboratory activities  Effects 4-5 – observation activities in the classroom  Final assessment includes:  - an open test result 60%  - reports of laboratory activities 20%  - activity in the classroom 20% |
| **Prerequisites** | Basic knowledge in general microbiology |
| **Course content with delivery methods** | LECTURE: Defining the aims of microbiological analysis in food production, and an indication of the modern, automated techniques to ensure fast and reliable assessment of the microbiological quality of the product. Criteria for the selection of techniques for continuous monitoring of the microbiological purity of the food and beverage production environment. An overview of the rules of operation and the identification of weaknesses and strengths of selected microbiological analysis systems designed for the use in the food industry. Systems designed to detect (Milliflex® Quantum system, EZ-FluoTM Rapid Detection System, TEMPO® system, HY-LITE® system) and microorganisms identification (API®, CHEMUMEX® technology, GENE-UP® platform) in food and environmental samples.  LABORATORY: Activities in the form of workshops for performing microbiological analysis of foods and to determine the state of hygiene and identification of microorganisms from the selected abiotic surfaces using automated systems:  1. Rapid detection of microorganisms in food industry focusing on bioburden monitoring in a production environments. Milliflex® Quantum system (Merck) – combines industry-standard membrane filtration techniques with a rapid fluorescent staining method for quantitative detection of viable and culturable microorganisms in liquid samples  2. EZ-FluoTM Rapid Detection System (Merck) – fluorescent staining technique used in rapid detection and quantification of microbial contamination in samples of food and beverages  3. TEMPO® system (bioMerieux) for a rapid monitoring of microbiological quality control parameters in food and beverages products as well as a food production environment. The system enables to detect and enumerate both the saprophytic microorganisms as well as E. coli, Enterobacteriaceae, Staphylococcus aureus in food samples.  4. Hygiene monitoring in real production area by means of HY-LITE® system (Merck) – a rapid system for detection of microorganisms in production environment samples  5. CHEMUMEX® technology (bioMerieux) – a rapid detection of viable culturable and viable non-culturable microorganisms by fluorescent staining using flow cytometry and solid state laser scanning cytometry  6. API® (bioMerieux) international standardized identification system for microorganisms – a reference international method for microorganisms identification  7. GENE-UP® platform (bioMerieux) for detection and identification of common pathogens if food industry e.g. Escherichia coli O157:H7 and Listeria spp. by molecular methods |
| **Basic reference materials** | 1. Buszewski B., Rogowska A., Pomastowski P., Złoch M., Railean-Plugaru V. 2017. Identification of microorganisms by modern analytical techniques, Journal Of AOAC International 100, 6, 1607-1623  2. Pomeranz Y. 2013. Food Analysis: Theory and Practice, Springer |
| **Other reference materials** |  |
| **Average student workload outside classroom** | 15 h |
| **Comments** |  |
| **Last update** |  |