**DESCRIPTION OF THE SAFE_12 MODULE IMPLEMENTED AS PART OF THE INTENSIVE FORM OF EDUCATION (IFoE)**

| | | | | |
|---|---|---|---|---|
| **Module Name** | *Food microbiology* | | | |
| **Language of Instruction** | english | | | |
| **Module Purpose** | The aim of the module is to familiarise students with the basic problems of food microbiology, including the identification of microorganisms occurring in food, determining microbiological hazards and learning about the use of microorganisms in the food industry. | | | |
| **Module Content** | Lectures will provide students with a basic understanding of microorganisms found in food, including bacteria, viruses, and fungi, with a particular emphasis on their role and impact on food safety. Microbiological threats associated with the presence of pathogenic microorganisms and the infectious diseases they cause will be presented.<br>The lectures will also cover methods for assessing the microbiological quality of food, such as classic solid media culture techniques and methods for enumerating microorganisms, as well as modern diagnostic methods, such as PCR and alternative methods that shorten analysis time.<br>Practical classes will include presentations and demonstrations of a kit for automated sample preparation and identification of microorganisms in food. The kit is based on a device operating in the MS 1000 mass spectrometry system, which allows for the rapid and precise identification of microorganisms based on molecular analysis. The kit is complemented by equipment for automated plating and colony counting, enabling efficient, automated microbiological food testing. | | | |
| **Description of learning outcomes** | Effect Symbol | Effect Name Methods | Verification and Documentation | Reference to Directional Effect Set |
| | KNOWLEDGE (graduate knows and understands) | | | |
| | W1 | Knows and understands basic information about microorganisms found in food, including bacteria, viruses and fungi, and their impact on food safety. | Knowledge test (test results documentation) grade weight 2.<br>A pass (3.0) is 51-60% correct answers, a pass plus (3.5) is 61-70%, a good pass (4.0) is 71-80%, a good pass plus (4.5) is 81-90%, and a very good pass (5.0) is 91-100% | SAFE_W02 |

"Project 'Specialist in Agricultural and Food Engineering in the context of Green and Digital Transformation (Twin Transition)' is financed from the European Funds for Social Development 2021-2027 (EFSD), under the NAWA project entitled 'Support for the creation and implementation of international education programmes', project no. FERS.01.05-IP.08-0436/23".

| | | | | |
|---|---|---|---|---|
| | W2 | Knows the methods for assessing the microbiological quality of food, both classical and modern | Knowledge test (test results documentation) grade weight 2.<br>A pass (3.0) is 51-60% correct answers, a pass plus (3.5) is 61-70%, a good pass (4.0) is 71-80%, a good pass plus (4.5) is 81-90%, and a very good pass (5.0) is 91-100% | SAFE_W01 |
| | SKILLS (graduate can) | | | |
| | U1 | Can identify microorganisms in food using MS 1000 mass spectrometry. | Assessment of student work in the laboratory, taking into account the accuracy of task execution, correctness of techniques and procedures – grade weight 1 | SAFE_U03 |
| | SOCIAL COMPETENCES (graduate is ready to) | | | |
| | K1 | Is ready to work in a team during laboratory work | Assessment of student teamwork | SAFE_K02 |
| **Module crediting method** | Passing with a grade | | | |
| **ECTS credit balance (total, developing practical skills, from classes conducted using distance learning methods and techniques)** | Number of contact hours/ECTS points | | Number of non-contact hours/ECTS points | |
| | Lectures (hours 1 ECTS points 0,04 )<br>Classes (hours 2 ECTS points 0,08) | | Reading literature (hours 1 ECTS points 0,04<br>Preparing for credit (hours 1 ECTS points 0,04) | |
| | **Total contact hours 3 hr. 0,12 pt. ECTS** | | **Total non-contact hours 2 hr. 0,08 pt. ECTS** | |

"Project 'Specialist in Agricultural and Food Engineering in the context of Green and Digital Transformation (Twin Transition)' is financed from the European Funds for Social Development 2021-2027 (EFSD), under the NAWA project entitled 'Support for the creation and implementation of international education programmes', project no. FERS.01.05-IP.08-0436/23".

| | |
|---|---|
| **Staffing** | Prof. dr hab. inż. Renata Różyło |
| **Information on the infrastructure ensuring the implementation of learning outcomes** | A set of devices for monitoring and automatically identifying microorganisms in food. The equipment includes the Autobio Diagnostics MS 1000 mass spectrometry-based microorganism identification system (Autof ms1000 MALDI-TOF mass spectrometer) and the Automimo 1200 automated MALDI-TOF sample preparation system. The set also includes a laminar flow cabinet and a set of devices enabling automated inoculation and colony counting, along with equipment for preparing material for inoculation and dilution. The most important of these are the Easyspiral dilute spiral inoculator and the Scan 1200 automatic colony counter.<br>The laboratory is located in the Innovation and Implementation Center for New Techniques and Technologies of the University of Life Sciences in Lublin at 28 Głęboka Street, on the second floor, with easy access for people with disabilities via an elevator in the building and a ramp. |
| **Planned teaching methods** | Lecture, laboratory classes |
| **Recommended reading list** | *Adams, M. R., McClure, P. J., & Moss, M. O. (2024). Food microbiology. Royal society of chemistry.*<br>*Banwart, G. (2012). Basic food microbiology. Springer Science & Business Media.*<br>*Ray, B., & Bhunia, A. (2025). Fundamental food microbiology. CRC press.* |

"Project ‘Specialist in Agricultural and Food Engineering in the context of Green and Digital Transformation (Twin Transition)’ is financed from the European Funds for Social Development 2021-2027 (EFSD), under the NAWA project entitled ‘Support for the creation and implementation of international education programmes’, project no. FERS.01.05-IP.08-0436/23”.