GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | PCR FOOD TESTING, PG_00063504 | | |
| Field of study | Biotechnology | | |
| Date of commencement of studies | October 2026 | Academic year of realisation of subject | 2027/2028 |
| Education level | second-cycle studies | Subject group | Optional subject group<br>Specialty subject group<br>Subject group related to scientific research in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish |
| Semester of study | 3 | ECTS credits | 2.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Chemistry Technology and Biotechnology of Food -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Paweł Filipkowski | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 0.0 | 0.0 | 15.0 | 0.0 | 15.0 | 30 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 30 | 5.0 | 15.0 | 50 |

**Subject objectives**

The student identifies and classifies pathogens and toxin-producing fungi in food and assesses their harmfulness. The student presents basic diagnostic systems used to detect adulteration in food. The student explains the principles of PCR.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_U05] proposes solutions to technological and scientific problems in biotechnology and related fields using experimental methods and bioinformatics, statistics and specialized databases | The student has broadened and in-depth knowledge of diagnostic and analytical methods within their specialization, with particular emphasis on molecular and microbiological diagnostics in food research. | [SU5] Assessment of ability to present the results of task<br>[SU4] Assessment of ability to use methods and tools<br>[SU3] Assessment of ability to use knowledge gained from the subject<br>[SU2] Assessment of ability to analyse information |
| [K7_W03] selects methods using living organisms and biomolecules to produce and process consumer goods | The student is able to select and apply diagnostic and analytical methods within his/her specialization, with particular emphasis on molecular and microbiological diagnostics in food research.Can identify GMO soybeans according to the standard. | [SW3] Assessment of knowledge contained in written work and projects<br>[SW1] Assessment of factual knowledge |
| [K7_U02] uses research methods used in biotechnology and related fields | Student uses PCR technology to identify | [SU3] Assessment of ability to use knowledge gained from the subject<br>[SU4] Assessment of ability to use methods and tools<br>[SU2] Assessment of ability to analyse information<br>[SU1] Assessment of task fulfilment |

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|---|---|
| Subject contents | Course content – laboratory<br><br>DNA isolation from bacterial cells and from plant and animal materials. Practical use of PCR to detect selected pathogens in food and to identify the raw material composition of meat products and plant products. Analysis of food products for the presence of GMOs.<br>Students will develop and present topics on the potential use of PCR-based molecular biology methods in food analysis for the presence of pathogens, toxigenic fungi, and GMOs, as well as for detecting adulteration in food products (e.g., meat products, coffee, marzipan). The advantages and disadvantages of these methods compared to conventional methods will be presented. Diagnostic kits for detecting pathogenic microorganisms found in food: Salmonella sp., Staphylococcus aureus, Listeria monocytogenes, Campylobacter jejuni, Yersinia enterocolitica, Clostridium botulinum, and Clostridium perfringens. |
| Prerequisites and co-requisites | Knowledge of General Biotechnology. Enzymes. Molecular Biology. Genetic Engineering. |

Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| a | 60.0% | 9.0% |
| z | 60.0% | 20.0% |
| x | 60.0% | 51.0% |
| y | 60.0% | 20.0% |

Recommended reading

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|---|---|
| Basic literature | BrońKaczmarska A., Furowicz A.J. Choroby odzwierzęce przenoszone drogą pokarmową. PZWL, Warszawa, 1999. |
| Supplementary literature | Kur J. Podstawy inżynierii genetycznej. Wydawnictwo PG, Gdańsk, 1994.<br><br>Bala J.: Biologia molekularna w medycynie. Elementy genetyki medycznej. PWN, Warszawa, 2008.<br><br>Abigail A. Mikrobiologia. PWN, Warszawa, 2005.<br><br>Brown T.A. Genomy. PWN, Warszawa, 2005<br><br>Alberts B. Podstawy biologii komórki. PWN, Warszawa, 2007.<br><br>Wojcierowski J. Genetyka medyczna. PWN, Warszawa, 2000.<br><br>Wskazane, przez prowadzącego, artykuły oraz materiały dostępne w Internecie. |
| eResources addresses | |
| Example issues/ example questions/ tasks being completed | PN wykrywania GMO |
| Practical activites within the subject | Not applicable |

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