Appendix No. 1.5 to the Resolution No. 7/2023

 of the Rector of the University of Rzeszów

**SYLLABUS**

**regarding the qualification cycle FROM 2024 TO 2025**

**Academic year ………..**

1. Basic Course/Module Information

|  |  |
| --- | --- |
| Course/Module title | *CeLL CULTURE IN VITRO* |
| Course/Module code \* |  |
| Faculty (name of the unit offering the field of study) | *College of Natural Sciences, Institute of Biotechnology* |
| Name of the unit running the course | *Faculty of Biotechnology* |
| Field of study | *Biotechnology* |
| Qualification level  |  |
| Profile | *Academic* |
| Study mode | *full time studies* |
| Year and semester of studies | *Third – winter semester* |
| Course type | *Laboratories* |
| Language of instruction | *English* |
| Coordinator | *Dr inż. Jagoda Adamczyk-Grochala* |
| Course instructor | *Dr inż. Jagoda Adamczyk-Grochala* |

\* - as agreed at the faculty

1.1.Learning format – number of hours and ECTS credits

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Semester(n0.) | Lectures | Classes | Laboratories | Seminars | Practical classes | Internships | others | **ECTS credits**  |
| 6 |  |  | 30 |  |  |  |  | 5 |

1.2. Course delivery methods

- conducted in a traditional way

- involving distance education methods and techniques

1.3. Course/Module assessment (exam, pass with a grade, pass without a grade)

pass with a grade

2. Prerequisites

|  |
| --- |
| Basic knowledge in cell biology, genetics and biochemistry with a minimum grade of 3 ECTS |

3. Objectives, Learning Outcomes, Course Content, and Instructional Methods

3.1. Course/Module objectives

|  |  |
| --- | --- |
|  | *By doing this course well, students will develop basic knowledge and skills in cell culture in vitro and become aware of technique used to culture different kinds of cells and to use cell culture as a model (e.g., toxicology, cancer biology, molecular biology). As students proceed through the course, they will be able to apply this knowledge, skills, and awareness to topics like the following:* |
| O1 | Organization of cell culture room, equipment, guidelines to work with cells *in vitro* |
| O2 | Cell culture media |
| O3 | Primary cultures and cell lines |
| O4 | 3D culture and organoids |
| O4 | Cell fusion, the production of monoclonal antibodies, the applications of monoclonal antibodies in basic sciences, diagnostics and therapy |
| O5 | Cell culture *in vitro* in toxicology |

3.2. Course/Module Learning Outcomes (to be completed by the coordinator)

|  |  |  |
| --- | --- | --- |
| Learning Outcome | The description of the learning outcome defined for the course/module | Relation to the degree programme outcomes |
| LO\_01 | describe how to proceed with cell culture *in vitro* | K\_W04, K\_W07  |
| LO\_02 | provide basic cell culture terminology at a general level and describe the organisation of cell culture room | K\_W15 |
| LO\_03 | describe cell culture media designed to culture specific cell lines | K\_U05 |
| LO\_04 | describe how to isolate the cells from explants | K\_U08 |
| LO\_05 | explain what are the risks to use stem cells especially genetically modified stem cells in therapy | K\_U10, K\_U12 |
| LO\_06 | describe how to produce monoclonal antibodies and what are the applications of monoclonal antibodies in basic and applied sciences | K\_K01, K\_K02,  |
| LO\_07 | describe how to culture organoids and other 3D cultures | K\_K04 |

**3.3. Course content (to be completed by the coordinator)**

1. Lectures

|  |
| --- |
| Content outline |
|  |

1. Classes, laboratories, seminars, practical classes

|  |
| --- |
| Content outline  |
| Biology of Cultures Cells |
| Laboratory design and Layout |
| Equipment |
| Aseptic Technique |
| Safety, Bioethics, and Validation |
| Culture Vessels and Substrates |
| Defined Media and Supplements, serum-free media |
| Primary Culture |
| Subculture and Cell Lines |
| Culture of Tumor Cells |
| Cryopreservation |
| Cell Separation and Characterization |

3.4. Methods of Instruction

Laboratory classes: designing and conducting experiments, scientific discussions

e.g.

*Lecture: a problem-solving lecture/a lecture supported by a multimedia presentation/ distance learning*

*Classes: text analysis and discussion/project work (research project, implementation project, practical project)/ group work (problem solving, case study, discussion)/didactic games/ distance learning*

*Laboratory classes: designing and conducting experiments*

4. Assessment techniques and criteria

4.1 Methods of evaluating learning outcomes

|  |  |  |
| --- | --- | --- |
| Learning outcome | Methods of assessment of learning outcomes (e.g. test, oral exam, written exam, project, report, observation during classes) | Learning format (lectures, classes,…) |
| LO-01-07 | discussion during Laboratory classes, Project, Raport, OBserwation diuring classes, written report on a selected topic, TESTs | *Laboratory classes* |

* 1. Course assessment criteria

|  |
| --- |
| To obtain passing grade on the course the following is required:1. that the student in an active way has participated and presented the compulsory parts (laboratory sessions, demonstrations, and group presentations),
2. has passed written laboratory reports,
3. has passed written tests. Students who did not pass the examination have the right to retake the examination at 1 additional occasions
 |

5. Total student workload needed to achieve the intended learning outcomes

– number of hours and ECTS credits

|  |  |
| --- | --- |
| Activity | Number of hours |
| Course hours | 30 |
| Other contact hours involving the teacher (consultation hours, examinations) | 35 |
| Non-contact hours - student's own work (preparation for classes or examinations, projects, etc.) | 60 |
| Total number of hours | 125 |
| Total number of ECTS credits | 5 |

\* One ECTS point corresponds to 25-30 hours of total student workload

6. Internships related to the course/module

|  |  |
| --- | --- |
| Number of hours | *-* |
| Internship regulations and procedures | *-* |

7. Instructional materials

|  |
| --- |
| Compulsory literature:Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, Sixth Edition, R. Ian Freshney, Published Online: 9 MAR 2011,DOI: 10.1002/9780470649367.fmatter, Copyright © 2010 John Wiley & Sons, Inc. |
| Complementary literature: PubMed- [Animal Biotechnology.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7325846/) 2020 : 269–293. Published online 2020 Jun 26. doi: [10.1016/B978-0-12-811710-1.00012-4](https://doi.org/10.1016/B978-0-12-811710-1.00012-4) PMCID: PMC7325846 Animal tissue culture principles and applications, [Anju Verma](https://pubmed.ncbi.nlm.nih.gov/?term=Verma%20A%5BAuthor%5D),1 [Megha Verma](https://pubmed.ncbi.nlm.nih.gov/?term=Verma%20M%5BAuthor%5D),2 and [Anchal Singh](https://pubmed.ncbi.nlm.nih.gov/?term=Singh%20A%5BAuthor%5D)3 |

Approved by the Head of the Department or an authorised person