



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Cell cultures - methods of obtaining biologically active substances [S1IFar2>KKmosba]

Course

Field of study

Pharmaceutical Engineering

Year/Semester

2/3

Area of study (specialization)

–

Profile of study

general academic

Level of study

first-cycle

Course offered in

Polish

Form of study

full-time

Requirements

elective

Number of hours

Lecture

0

Laboratory classes

0

Other

0

Tutorials

15

Projects/seminars

0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

A student studying the subject should have basic knowledge of biology, chemistry and physics from high school.

Course objective

The classes are intended to familiarize students with the problems related to the production of substances with biological activity using biotechnological methods. The topics of the classes will include issues related to the conditions for establishing and conducting in vitro cell cultures in various systems and further biotechnological processes used in the production of selected compounds of importance in pharmacy. The student will become acquainted with methods of conducting cell cultures of microorganisms, plants, animals and humans, and will learn about the potential possibilities of biosynthesis of substances with biological activity in in vitro cultures, mainly therapeutic proteins. The student will master the ability to prepare detailed studies of selected biotechnological processes.

Course-related learning outcomes

Knowledge:

1. Has knowledge in the field of physicochemical and biological foundations of health sciences to the extent appropriate for pharmaceutical engineering, including basic issues included in subjects such as biology, pharmaceutical botany, biotechnology, biochemistry, molecular biology, human anatomy and physiology [K_W5]
2. Has knowledge of the development of pharmaceutical engineering and the research methods used in it, as well as the directions of development of the pharmaceutical industry in the country and around the world [K_W14]
3. Has knowledge of natural and synthetic raw materials, products and processes used in the pharmaceutical industry [K_W13]
4. Has detailed knowledge about substances for pharmaceutical and cosmetic use, dietary supplements, plant raw materials, their production, analysis and quality control, technology and general knowledge about the metabolism and effects of drugs and the correct use of medicinal products, knows the principles of creating a summary of characteristics of a medicinal product and an information leaflet for the patient, knows and understands the rules for authorizing medicinal products, medical devices, cosmetics and dietary supplements, knows the pharmacopoeial requirements for assessing the quality of medicinal substances and products [K_W25]

Skills:

1. Understands the literature on pharmaceutical engineering in Polish; reads and understands simple scientific and technical texts in a foreign language, is able to obtain information from literature, databases and other sources related to pharmaceutical engineering, also in a foreign language, integrate it, interpret it, draw conclusions and formulate opinions [K_U1]
2. Can prepare a well-documented study in the field of pharmaceutical engineering in Polish and a foreign language [K_U5]
3. Can prepare and present, both in Polish and a foreign language, an oral presentation on specific issues of pharmaceutical engineering [K_U6]
4. Has the ability to self-educate [K_U2]

Social competences:

1. Is ready to critically evaluate his knowledge, understands the need for further education, supplementing specialized knowledge and improving his professional, personal and social competences, understands the importance of knowledge in solving problems and is ready to seek the opinion of experts [K_K1]
2. Can think and act in an entrepreneurial way [K_K6]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The exercises end with a written assessment of the subject in the form of test questions (stationary or remote form depending on the epidemiological situation).

Programme content

1. Maintaining microbial, animal, and human cell cultures for the production of therapeutic proteins.
2. Scaling production in bioreactors.
3. Characterizing cell cultures.

Course topics

The student will become familiar with the methods of conducting cell cultures of microorganisms (bacteria and fungi), animal (insects, mammals) and human cells used to obtain specific therapeutic proteins. Issues related to increasing the scale of production in bioreactors will be discussed. Students, based on the teaching materials provided, prepare detailed studies of selected biotechnological processes. These are descriptions of processes using microorganisms, animal and human cells, taking into account such issues as: characteristics of cell culture, purpose of production, preparation of cells/organism for the production process, course of the production process, isolation and purification of the product and analysis of its quality, product characterization target, preparation of a commercial form.

The topics discussed will be the subject of student presentations and discussions.

Teaching methods

Lecture, work with text, multimedia presentations, discussion

Bibliography

Basic:

1. Ratledge C., Kristiansen B (red.) Podstawy biotechnologii , Wyd. Nauk. PWN, 2011.
2. Malepszy S. (red.) Biotechnologia roślin , PWN, 2009.
3. Fiedurek J., Bednarski W. Podstawy biotechnologii przemysłowej , WNT, 2012.
4. Woźny A., Przybył K. Komórki roślinne w warunkach stresu. Tom II. Komórki in vitro. , Wydawnictwo Naukowe UAM, Poznań, 2004.

Additional:

1. Walsh G. Biopharmaceuticals. Concepts and Applications. , John Wiley & Sons, 2007.
2. Kayser O., Muller R. (red.) Biotechnologia farmaceutyczna , PZWL Warszawa, 2003.
3. Kayser O. Podstawy biotechnologii farmaceutycznej , Wydawnictwo Uniwersytetu Jagiellońskiego , 2006.
4. Gad Sh.C. (red.) Handbook of pharmaceutical biotechnology , Wiley, New Jersey, 2007.
5. Fiedurek J. (red.) Podstawy wybranych procesów biotechnologicznych , WNT, 2014.
6. Crommelin D.J.A., Sindelar RD, Meibohm B (eds.) Pharmaceutical biotechnology: fundamentals and applications (Third Edition). , Informa, New York, 2008.
7. Buchowicz J. Biotechnologia molekularna , Wyd. Nauk. PWN, 2012.
8. Bednarski W., Fiedurek J. (red.) Podstawy biotechnologii przemysłowej , WNT, 2009.
9. Scientific journals containing articles on the conduct and application of various cell cultures in biotechnology, Biotechnology, Elsevier, Springer, Wiley, etc.

Breakdown of average student's workload

	Hours	ECTS
Total workload	30	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	15	0,50