

(SYLABUS)

Name of the department / clinic providing the course:

Department of Immunopathology

Course title: Biotechnologia

Course profile: practical

Speciality: Medical Biotechnology

Level of course unit: II grade

Course unit title: Pracownia Practice rotation - Cases in biotechnology

Course unit code:

Type of course unit: optional

Course aims:

The aim of the course will be to use the knowledge gained during the level 2 studies to analyze the state of the art and literature and design a potential drug for a disease of known pathogenesis

Form of study: Stacjonarne

Year of study: 2

Types of educational activities and number of hours allocated:

Subject	Language course	Self-study	Lecture	Exercises	Laboratory	Seminar	Practical	e-learning	Profession practice	Other (what?)	ECTS points
		74					76				5

Number of ECTS credits allocated and their structure according to students' from of learning:

Names of course unit's faculty:

dr hab. n. med. Joanna Wieczfińska, prof. UM

Prerequisites:

Before taking the exam, you must have passed:

Learning activities and teaching methods:

Practice seminars, discussion, group work, problem solving, *in silico* studies, literature analysis, discussion

Course unit content:

The class will be divided into 5 modules, during which students, (divided into groups) will be tasked with designing a potential drug for a selected disease of known pathogenesis.

1. Disease of known pathogenesis (7h)

- Discussion of the pathogenesis of five selected diseases and their pathogenesis (diabetes mellitus, Alzheimer's disease, Tay-Sachs disease (from the group of storage diseases), atopic dermatitis, Rey syndrome (from the group of mitochondrial diseases))

2. Analysis of available treatments and evaluation of their efficacy (7h)

3. Patent claim cases - Review of selected disease-specific rulings, discussion (7h)

4. Patent claim cases - Regulatory requirements for medicines, including biosimilars (7h)

5. Drug discovery - Experimental planning and the essence of optimizing research techniques - Expression systems used in biotechnology drug technology (8h)

6. Drug discovery - small molecule drugs, poly- and monoclonal antibodies or vaccines, protein structure prediction by *in silico* methods (de novo and comparative modelling, use of knowledge of protein structures in drug design (*in silico* methods) (7h)

7. Drug discovery - Exploration of research platform, literature review, discussion of options part I (8h)

8. Drug discovery - Exploration of research platform, literature review, discussion of options part II (7h)

9. Drug discovery - Vector selection and design - plan and rationale for group selection (7h)

10. Drug discovery - Delivery systems for proposed drugs (7h)

11. Summary (4h)

Course objectives:

Knowledge:

- BM2_PO_W01 Student knows and understands complex biological phenomena and processes at the molecular, cellular, tissue and organismal levels and bases their interpretation in research work and practical activities on a rigorous and consistent approach using empirical data
- BM2_PO_W02 Student has an extended and deepened knowledge of selected sciences, useful for the analysis and modelling of biological processes
- BM2_PO_W03 Student explains genetic phenomena at the level of molecular pathology, genomics and functional genomics (genome and transcriptome) also on a population scale
- BM2_PO_W07 Student is familiar with specialized IT and biostatistical tools
- BM2_PO_W13 Student knows methods of designing small-molecule drugs as ligands for macromolecules in the cell
- BM2_PO_W17 Student knows and understands the basic concepts and principles of industrial property protection and copyright; is able to use patent information resources

Skills:

- BM2_PO_U01 Students, using their knowledge, plan and carry out research tasks using large-scale techniques, analytical methods, computer simulations
- BM2_PO_U05 Student speaks English at B2+ level in the biomedical sciences, in particular medicine and biology and biotechnology, clinical research and drug production
- BM2_PO_U07 Student uses and integrates information obtained from the literature and electronic databases, analyses, interprets and critically evaluates it
- BM2_PO_U10 Student can critically appraise the relevance and applicability of new developments and data in the fields of medicine, pharmacy, biotechnology and bioinformatics
- BM2_PO_U06 Student prepares presentations and studies of the results of his/her research work in Polish and English and discusses his/her findings with the scientific community

Attitudes and transferrable (generic) competencies:

- BM2_PO_K01 Student understands the need for lifelong learning; is able to activate, inspire and organize the learning process of others
- BM2_PO_K01 Student regularly update his/her knowledge in the fields of biology, pathology, medicine and biotechnology and see the possibilities of its practical application
- BM2_PO_K02 Student can interact and work in a group, both as a team leader and a member of a team
- BM2_PO_W03 Student explains genetic phenomena at the level of molecular pathology, genomics and functional genomics (genome and transcriptome) also on a population scale
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- BM2_PO_K03 Student is able to correctly identify priorities in order to accomplish a task defined by him/herself or others
- BM2_PO_K04 Student is able to correctly identify and solve ethical dilemmas related to his/her profession; is aware of his/her responsibility for making decisions
- BM2_PO_W14 Student knows methods of propagation and purification of recombinant proteins

Required and recommended learning resources (readings):

Required:

-Textbook of Drug Design and Discovery Edited By Kristian Stromgaard, Povl Krosgaard-Larsen, Ulf Madsen, Copyright Year 2017. ISBN 9781032339948

Recommended:

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Assessment methods and criteria:

(1) Attendance at all practices are mandatory.

2. the Student is entitled to one absence during the course. In case of having an excused absence, the Student has the right to earn credits from these classes at another time.

(3) Any absence in excess of one absence, the Student is required to excuse. The only valid excuse is a medical exemption. In addition, each such absence must be made up or credited on the basis of an essay within 7 days (subject of the class or determined by the instructor, 6 pages, about 17 thousand characters with spaces, font 12 pt. interline 1.5, at least 10 items of bibliography from the last 5 years).

Additional information:**Statement and signature of the course leader:**

I hereby state that the content of the curriculum included in the syllabus below is the result of my individual work completed as part of work contract/cooperation resulting from a civil law contract, and that author rights to this title are not the property of a third party.

Dean's signature:**Data:**