COURSE/MODULE DESCRIPTION (SYLLABUS)

1.	Course/module **Immunology**
2.	Scientific discipline **Medical sciences**
3.	Language of instruction **English**
4.	University department **Faculty of Biotechnology**
5.	Course/module type – mandatory (compulsory) or elective (optional) **Mandatory**
6.	University subject (programme/major) **Biotechnology**
7.	Degree: *(master, bachelor)* **Bachelor**
8.	Year **3rd**
9.	Semester **Summer semester**
10.	Form of tuition and number of hours **lecture, 30 hours**
11.	Initial requirements (knowledge, skills, social competences) regarding the course/module and its completion: • **basic knowledge of biochemistry and cell biology**
12.	Objectives **The main objective of the course is to familiarize students with:** • mechanisms of immune regulation; • principles of selected immune system diseases; • mechanisms of action of vaccinations; • mechanisms of action of anti-inflammatory, anti-allergic, and immunosuppressive drugs; • diagnostic methods; • methods of antibody production and use.

13.	**Basic curriculum content:**
	• **structure and components of the immune system;**
	• **nonspecific and specific immunity;**
	• **cellular and humoral immunity;**
	• **antibodies and their role in immunity;**
	• **immunological tolerance:**
	  • major histocompatibility system,
	  • mechanisms for distinguishing self from foreign antigens;
	• **vaccines**:
	  • mechanisms of immunization,
	  • types of vaccines;

	• directions of vaccination development; • **inflammation**: • cells and mediators involved in inflammation, • the course of inflammation; • **immunological techniques in laboratory tests:** • Lateral-flow immunoassays, • ELISA, • Western-blotting, • Flow cytometry, • Cell sorting; • **use of antibodies in diagnosticis and therapy:** • antibody modifications, • monoclonal antibodies, • humanized antibodies, • antibody drug conjugates; **Advanced curriculum content:** • **immunology of reproduction**: • mechanisms of pregnancy recognition by the immune system and the development of tolerance to the fetus, • immunological causes of infertility; • **transplants and immunosuppression;** • **autoaggression:** • factors influencing the development of autoimmunity, • examples of autoimmune diseases; • **primary and acquired immunodeficiencies:** • causes, • diagnostics • therapies; • **cancer immunology**: • natural anti-cancer defence, • cancer antigens, • inflammatory environment of cancer, • immunotherapy and anti-cancer vaccines; • **allergies:** • mechanisms of allergy development, • factors influencing the development of allergies, • allergy diagnosis; • **drugs:** • anti-inflammatory drugs, • immunosuppressive drugs, • anti-allergic drugs.	
14.	Learning outcomes **Student:** • characterizes the structure and components of the immune system and explains the differences between adaptive and innate immunity, as well as cellular and humoral immunity;	Outcome symbols **K1_W01** **K1_W03** **K1_W05**

	• explains the role of the histocompatibility complex; • describes the stages of inflammation and the cells and mediators involved; • describes the types of vaccines and the mechanisms of immunization; • describes modern trends in vaccine development; • defines the mechanisms of autoimmune diseases, allergies, immunodeficiencies (primary and acquired), and the immunological processes associated with pregnancy, transplantation, and cancer; • lists and describes the mechanisms of action of selected anti-inflammatory, immunosuppressive, and anti-allergic drugs. • knows the modifications and applications of antibodies in diagnostics, therapy, and research; • explains the principles of techniques such as lateral-flow immunoassays, ELISA, Western blot, flow cytometry, and cell sorting; • recognizes the importance of sound scientific knowledge in the field of immunology when resolving dilemmas, particularly regarding vaccine safety; • combines information from various reliable and current scientific sources and formulates reasoned judgments using correct language and terminology in the field of immunology.	**K1_W08** **K1_K01**
15.	**Obligatory textbook:** • **Janeway's Immunobiology**; Murphy K, Garland Science; **Recommended textbooks:** • **Immunology**; Male D., Brostoff J., Roth DE. and Roitt IM. Saunders; • other literature recommended by the lecturer.	
16.	**Methods for assessing the learning outcomes:** **• Written exam divided into two parts:** **Basic part exam:** 1. Innate immunity 2. MHC 3. T lymphocytes and NK cells 4. B lymphocytes and antibodies 5. Inflammatory responses 6. Vaccination 1 7. Vaccination 2	

	8. Polyclonal and monoclonal antibodies - production and applications **Advanced part exam:** 10. Transplants, anti-inflammatory and immunosuppressive drugs 11. Reproductive immunology 12. Immunodeficiencies 13. Autoimmunity 14. Allergies 15. Cancer immunology **To pass the course, a pass in the basic section is required with at least 50% of the points.** Points from both parts of the exam will be added together. Final grading scale: 0 p. ≤ **2.0** < 15 p. 15 p. ≤ **3.0** < 18 p. 18 p. ≤ **3.5** < 21 p. 21 p. ≤ **4.0** < 24 p. 24 p. ≤ **4.5** < 27 p. 27 p. ≤ **5.0** ≤ 30 p.	
17.	• Ways of earning credits for the completion of a course /particular component, methods of assessing academic progress: **obtaining a positive grade in the exam**	
	Hours of instruction (as stipulated in study programme):	liczba godzin przeznaczona na zrealizowanie danego rodzaju zajęć
	• **lecture**	**30 hours**
	Student's own work: • **reading the recommended literature** • **consultations** • **exam preparation**	**40 hours**
	Total hours	**70 hours**
	ECTS points	**3 ECTS**