The third (educational and scientific) level
For doctors of philosophy
(*part-time* form of study)

Educational component B1

Discipline	***Problematic issues of pharmaceutical biotechnology***
Level of higher education	Third (educational and scientific)
Course	2 (3 sempester)
Credits	5 ECTS
Language of instruction	Ukrainian
Department	FBT Industrial Biotechnology
Requirements for the beginning of the study	Based on the knowledge gained by students in the study of disciplines: Fundamentals of pharmaceutical production, Problematic issues of modern biotechnology, Design of biotechnological and pharmaceutical production, Regulatory support of biotechnological production
What will be studied	Principles of development of innovative pharmaceuticals, problems of creation of ready dosage forms on the basis of biotechnological substances, biopharmaceutical technologies and features of production
Why it is interesting / necessary to study	The course will provide an opportunity to form students' abilities: - to the study of biotechnological substances as the basis of innovative pharmaceuticals; - to search, process and analyze information on the design of promising dosage forms; - to critical assessment of problematic issues and situations in the implementation of technological processes of production of biopharmaceuticals
What you can learn (learning outcomes)	**knowledge:** - problematic issues of modern pharmaceutical biotechnology for the creation of new drugs and industries; - modern methods of conducting research in the design and development of effective finished dosage forms based on biotechnological substances; - modern biochemical and biopharmaceutical approaches for the improvement of biotechnological substances and design of technological processes. **skills:** - to apply modern tools and technologies of search, processing and analysis of information in the field of pharmaceutical biotechnology; - to develop new and improve existing pharmaceutical biotechnologies for the production of practically valuable products; - critically analyze the results of their own research and the results of other researchers in the context of the whole set of modern knowledge on the development of biopharmaceutical products
How to use the acquired knowledge and skills (competencies)	Ability to perform original research, achieve scientific results that create new knowledge in the field of pharmaceutical biotechnology and pharmaceutical bioengineering and can be the basis for the development of innovative technologies of biopharmaceuticals or improvement of existing ones.
Information support	Curriculum and working program of the discipline, rating system.
Form of classes	Lectures, practical classes, technologies of blended and distance learning
Semester control	Exam

Discipline	***Modern development of biotechnologies of waste processing and bioenergy***
Level of higher education	Third (PhD)
Course	**2**
Credits	5 ECTS
Language of instruction	Ukrainian
Department	Department of Ecobiotechnology and Bioenergy FBT
Requirements for the beginning of the study	The course is based on knowledge gained by students from previous fundamental and professionally-oriented disciplines of the "master" level, namely analytical chemistry, microbiology, biochemistry, bioenergy, biophysics, methods of analysis in biotechnology, human and animal physiology.
What will be studied	Trends in the development of bioenergy and biotechnology of waste processing in the world and in Ukraine, in particular. Modern technologies for the production and use of biofuels, namely solid biofuels for heat supply, varieties of liquid biofuels for use as motor fuels, gaseous biofuels for heat and electricity. Cogeneration technologies. Thermochemical energy processes (combustion, gasification, pyrolysis), chemical processes, biochemical processes. Methods for assessing the quality of biofuels and raw materials for their production.
Why it is interesting / necessary to study	The search for new energy sources and the processing of waste of various origins into products useful to mankind is the main modern world trend. By using resources such as waste biomass energy, humanity will stop polluting the environment and save valuable resources.
What you can learn (learning outcomes)	• Develop new and improve existing environmental biotechnologies (water, soil, air purification). • Develop new and improve existing biotechnologies to obtain practically valuable biotechnological products for various purposes from waste. • Assess the risks of the introduction of modern biotechnology for the natural environment, human health. • Perform original research, achieve scientific results that create new knowledge in the field of environmental biotechnology and bioenergy.
How to use the acquired knowledge and skills (competencies)	- apply modern biotechnology to obtain liquid and gaseous fuels from biomass; - use physico-chemical methods to obtain solid biofuels; - use physico-chemical and biological methods of waste processing to obtain useful products.
Information support	Curriculum and working program of the discipline, rating system.
Form of classes	Lectures and seminars.
Semester control	Exam

Educational component B2

Discipline	***Innovative ready-made forms of biological products***
Level of higher education	Third (educational and scientific)
Course	2 (3 sempester)
Credits	5 ECTS
Language of instruction	Ukrainian
Department	FBT Industrial Biotechnology
Requirements for the beginning of the study	Based on knowledge gained by students in the study of disciplines: General Biotechnology, Problematic issues of microbial biotechnology, Problematic issues of pharmaceutical biotechnology, Problematic issues of modern biotechnology, Biotechnology of agricultural products, Biotechnology of food production
What will be studied	The main types of modern and promising finished forms of biomolecules and cells in accordance with the purpose of drugs, methods of design and production of innovative finished forms of biologicals, the principles of their application, features of finished forms of biologicals in accordance with areas of application
Why it is interesting / necessary to study	The course will provide an opportunity to: - analysis, creation and use of promising ready-made forms based on cells and biomolecules in various fields and research practice; - to develop ready-made forms of biologicals for various industries, medicine, agriculture, etc.
What you can learn (learning outcomes)	**knowledge:** - basic methods and principles of designing biological products for different areas of practical application; - principles of choosing an effective finished form of biological product and optimization of existing forms; - features of production and finishing stages of biotechnologies for obtaining modern and promising finished forms of biological products **skills:** - ability to choose the finished form of the biological product in accordance with the type of biological object and the tasks of its further use; - to analyze the effectiveness of the finished form and the activity of biomolecules in the composition of such structures and drugs; - to determine the feasibility of creating a certain finished form of the biomolecule and the prospects for the use of the created drugs.
How to use the acquired knowledge and skills (competencies)	Apply the acquired knowledge and experience to solve complex problems and problems in specialized areas of professional activity or training, which involves the creation of new innovative and improved already used ready-made forms of biologicals or biosynthesis processes and finishing stages to obtain target products in effective and stable finished forms
Information support	Curriculum and working program of the discipline, rating system.
Form of classes	Lectures, practical classes, technologies of blended and distance learning
Semester control	Exam

Discipline	***Controlled synthesis of metabolites***
Level of higher education	Third (PhD)
Course	2
Credits	5 ECTS
Language of instruction	Ukrainian (english)
Department	Department of Ecobiotechnology and Bioenergy FBT
Requirements for the beginning of the study	The discipline is based on the knowledge received by students from previous fundamental and professionally-oriented disciplines of the level "bachelor and master" such as microbiology, biochemistry, chemistry of nutrients.
What will be studied	Influence of physical and chemical factors of the environment during cultivation on cell metabolism in order to increase the yield of the target product; bioengineering techniques to provide the necessary properties to the cells of microorganisms.
Why it is interesting / necessary to study	1) The possibility of developing innovative biotechnologies to increase the yield of the target product, improve the environment, energy synthesis; 2) Methods and approaches to control the metabolism of microorganisms for the production of various substances by one species; 3) Understanding of problematic issues in the creation of novel biotechnologies.
What you can learn (learning outcomes)	- Analyze the possibilities of using biotechnological, chemical and physico-chemical methods and their combinations for the development of technologies for the cultivation of microorganisms to obtain the target product. - Use advanced methods to offer technological solutions for the cultivation of microalgae to obtain specific nutrients of different directions. - Manage the metabolism of microorganisms.
How to use the acquired knowledge and skills (competencies)	the student will have the ability to: - Analyse existing technologies and generation of new ideas (hypotheses) to create the latest biotechnologies or improve existing ones by managing the metabolism of microorganisms; - use modern methods of influencing the microorganism to obtain a specific product - perform original research to achieve new knowledge in the field of biotechnology and bioengineering.
Information support	Curriculum and working program of the discipline, rating system.
Form of classes	Lectures and seminars.
Semester control	Exam