Discipline	Analysis and research of development of lightning discharge channel as dynamic system
Level of HE	Third (educational and scientific)
Course	2
Scope	4 ECTS credits
Language of instruction	Ukrainian, English
Department	Theoretical electrical engineering
Requirements for the beginning of study	Basic knowledge of general physics, theoretical foundations of electrical engineering, industrial electronics, electromagnetic compatibility of technical means. Initial ideas about the main types and characteristics of electrical equipment in electrical and other systems and installations for which the electromagnetic effects of lightning discharges can be critical.
What will we study?	Fundamentals of atmospheric electric discharges of different types and related electromagnetic fields, currents and voltages. Dangerous effects from direct and indirect (in particular, induced) lightning actions. Statistics on lightning parameters and methods of recording their characteristics. Methods and means of protection of buildings, electrical systems and equipment from hazardous effects associated with lightning discharges. Human and animal safety issues. Normative documents on lightning protection and means of protection of buildings, power and electronic equipment. Protection of electrical networks, data transmission systems. Features of protection of overhead and cable power lines. Selection and application of protective devices to limit overvoltages and high currents. Lightning rods. Grounding systems. Examples of lightning protection of various objects. Practical development of lightning protection systems for various objects, selection of components.
Why this is interesting / worth learning	Buildings, electrical systems, people, various structures, installations and equipment in the conditions of thunderstorm activity are exposed to the danger associated with various effects of lightning. There is a special danger for expensive station equipment in the energy sector, oil refining facilities, explosives-related industries, and modern electronic devices that are sensitive to even minor electromagnetic influences. Therefore, most facilities, electrical and other engineering networks, equipment in almost all industries require the development and installation of protection systems against direct and indirect lightning.
Why you can learn (learning outcomes)	Focus on issues of protection against the dangerous effects of lightning for buildings and electrical and other systems that relate to various industries and are important for many specialties and specializations. Perform practical development of lightning protection systems, reasonably select the necessary components for its implementation.
How to use the acquired knowledge and skills (competences)	Assess hazards associated with lightning impacts on various facilities (including energy, including renewables). Analyze existing and develop new lightning protection systems for various objects, in accordance with current regulations. Perform calculations of lightning protection systems and reasonably choose the components of these systems and surge protection devices in electrical systems.
Information support	Syllabus, teaching materials (manuals, presentations for lectures, etc.), standards.
Form of conducting classes	Lectures, practical classes.
Semester control	Test