

ANNOTATION
of the course program
“Carbon-based nanomaterials”

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1. **The name of the education program involving the course:** 28.04.01 Nanotechnology and microsystem technology (Master program “Material science of nanosystems”)
2. **The total workload:** 1 credit point (36 hours).
3. **The place of the course in the structure of the educational program.** The course “Carbon-based nanomaterials” is offered in the 1st semester. To study this course, the background knowledge of the basic sections of physics is required to be mastered. This course is required for the following internships, included in the training plan within the educational program.
4. **The objective of the course « Carbon-based nanomaterials »:** acquiring the knowledge on the peculiarities of the carbon-based nanomaterials, particularly, on the problems, the areas, the tendencies and the promises of the nanotechnology development, adjacent fields of science and technology; getting skills of the scientific merit estimation and application promises of research findings in nanotechnology sphere.
5. **Requirements for the results of mastering the course.** The course is focused on forming the following *general professional (GPC)* and *professional (PC) competences*:
 - the ability to acquire knowledge and use new knowledge and skills in a practice in some subject area (*GCC-4*);
 - to formulate the research goals and objectives in nanotechnology and microsystem technology sphere, to select reasonably theoretical and experimental techniques and solution tools of formulated tasks (*PC-1*);
6. **The course content:**
 - Module 1. Carbon-based materials.
 - Subject 1. The basic concepts. The main properties of carbon-based materials. Electron properties of carbon compounds.
 - Subject 2. Application of carbon-based materials.
 - Module 2. Carbon-based nanomaterials.
 - Subject 1. Carbon nanotubes. Techniques of nanotubes synthesis. Unique properties: thermal conductivity, electric conductivity, and strength properties. Current application.
 - Subject 2. Graphene. Techniques of graphene synthesis. Unique properties: electrical conductivity, optical transparency, and strength properties. Current application.
 - Subject 3. Fullerene. Synthesis techniques and research methods. Current and future application.
7. **The basic educational technologies.** Within the course «Carbon-based nanomaterials» classes are provided in the format of lectures and seminars. The active and interactive forms of conducting classes are not provided.
8. **Forms of control:** the current control involves the estimation of the participation during seminars, the midterm assessment implies the colloquium summarizing the results of each unit; the end-of-course assessment involves examination.