

## "MATHEMATICAL MODELING OF ENGINEERING FACILITIES AND PROCESSES"

(course title)

### **COURSE SYLLABUS ABSTRACT**

7-06-0714-02 – "Innovative technologies in mechanical engineering"

(specislity code and name)

Mechanical engineering and machine science

Welding technologies

Computer engineering of transport and technological machines

(concentration)

Advanced higher education

|                                               | STUDY MODE |           |
|-----------------------------------------------|------------|-----------|
|                                               | full-time  | part-time |
| Year                                          | 1          | 1         |
| Semester                                      | 1          | 1         |
| Lectures, hours                               | 16         | 4         |
| Practical classes, hours                      | 16         | 4         |
| Exam, semester                                | 1          | 1         |
| Contact hours                                 | 32         | 8         |
| Independent study, hours                      | 76         | 100       |
| Total course duration in hours / credit units | 108 / 3    |           |

#### **1. Course outline**

The purpose of the discipline is to present to students a range of issues related to the construction of empirical mathematical models of technical objects and systems.

#### **2. Course learning outcomes**

Upon completion of the course, student will be expected to

##### **know:**

- the basic principles of statistical methods for constructing empirical models;
- model quality criteria and measures to ensure them;
- methodological foundations of the experiment;

##### **be able to:**

- evaluate the accuracy of experimental data;
- plan experimental studies, determine factors and output variables of empirical models;
- use the least squares criterion and methods of planning factor experiments to build models;
- evaluate the quality of empirical models;

##### **to possess a skill:**

- possession of computer tools for processing and analyzing research results.

#### **3. Competencies**

| Codes of formed competencies | The names of the competencies being formed                                                                                                                         |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UK-1                         | Apply methods of scientific cognition in research activities, generate and implement innovative ideas                                                              |
| UK-2                         | Solve research and innovation tasks based on the use of information and communication technologies                                                                 |
| UK-4                         | Provide communication, demonstrate leadership skills, be capable of team building and the development of strategic goals and objectives                            |
| UK-5                         | Develop innovative receptivity and ability to innovate                                                                                                             |
| UK-6                         | Be able to predict the conditions for the implementation of professional activities and solve professional tasks in conditions of uncertainty                      |
| UPK-1                        | To choose methods of mathematical modeling of technical objects and processes of manufacturing machine parts using computer technology to solve practical problems |
| UPK-2                        | Optimize equipment and tooling designs, mechanical assembly production technologies                                                                                |

#### **4. Requirements and forms of midcourse evaluation and summative assessment**

To assess the level of knowledge of students, the following diagnostic tools are used: reports on practical work with their oral defense; passing the exam.