



**Syllabus of the course**  
 «Mathematical methods and models in scientific research»

<b>Specialty</b>	051 Economics	
<b>Study Programme</b>	Economics	
<b>Study cycle (Bachelor, Master, PhD)</b>	Third level	
<b>Course status</b>	Mandatory	
<b>Language</b>	English	
<b>Term</b>	2nd year, 3rd semester	
<b>ECTS credits</b>	The number of credits according to the curriculum is 5	
<b>Workload</b>	Lectures – 20 hours	
	Laboratory studies – 20 hours	
	Independent work - 110 hours	
<b>Assessment system</b>	Credit	
<b>Department</b>	Economic Cybernetics and System Analysis Department, room 419 (main building), (057)702-06-74 (3-56), <a href="https://ek.hneu.edu.ua/">https://ek.hneu.edu.ua/</a>	
<b>Teaching staff</b>	Guryanova Lidiya Semenivna, Head of Economic Cybernetics and System Analysis Department, Doctor of Economics, Professor	
<b>Contacts</b>	<a href="mailto:guryanovalidiya@gmail.com">guryanovalidiya@gmail.com</a> , <a href="https://ek.hneu.edu.ua/vykladachi/gur-yanova-lidiya-semenivna/">https://ek.hneu.edu.ua/vykladachi/gur-yanova-lidiya-semenivna/</a> :	
<b>Course schedule</b>	Schedule of classes: <a href="http://services.hneu.edu.ua:8081/schedule/selection.jsf">http://services.hneu.edu.ua:8081/schedule/selection.jsf</a>	
<b>Consultations</b>	Schedule of consultations: <a href="https://ek.hneu.edu.ua/">https://ek.hneu.edu.ua/</a> :	
<b>The purpose of the educational discipline</b>		
Study of the theoretical foundations and possibilities of practical application of methods of modelling systems operating under conditions of uncertainty during scientific research.		
<b>Prerequisites for study</b>		
<b>Structural and logical scheme of the course</b>		
<b>Prerequisites</b>	<b>Postrequisites</b>	
Philosophy of Science, Methodology and organization of scientific research	Scientific research work	
<b>Course content</b>		
Content module 1. Methods and models of multidimensional data analysis		
Topic 1. Modelling as a method of scientific knowledge of complex systems. Peculiarities of the application of cluster analysis methods.		
Topic 2. Classification with training. Methods of discriminant analysis		
Topic 3. Methods of reducing the feature space		
Topic 4. Models and methods of factor analysis		
Content module 2. Methods of advanced econometrics		
Topic 5. Problems of developing econometric models		
Topic 6. Models with discrete variables		
Topic 7. Panel data models		
Topic 8. Dynamic models. VAR and ECM models		
<b>Teaching environment (software)</b>		
Multimedia projector, PNS of S.Kuznets KNUE, ZOOM, MS Office, Statistica, EViews, R, Python		



### **Assessment system**

The system for evaluating the developed competencies of graduate students takes into account the types of classes that, according to the program of the academic discipline, include lectures, laboratory classes, as well as independent work. The evaluation of the developed competences is carried out according to the accumulative 100-point system. Control measures include:

- current control, which is carried out during the semester during lectures and laboratory classes and is evaluated by the amount of points scored;

- module control, which is carried out taking into account the current control of the corresponding content module and aims at an integrated assessment of the learning results

Current control of this academic discipline is carried out in the following forms:

- active work in lectures and laboratory classes;

- defense of laboratory assignments;

- carrying out control works;

- performing of an individual research task.

Modular control is carried out in the form of complex control work. The modular control is carried out at the PNS after all the theoretical material has been reviewed and individual tasks have been completed within each of the two modules. More detailed information on the system of evaluation and accumulation of points for the academic discipline is provided in the work plan (technological card) for the academic discipline.

### **Course policies**

Teaching of the academic discipline is based on the principles of academic integrity.

Violation of academic integrity includes academic plagiarism, fabrication, falsification, cheating, deception, bribery, and biased assessment.

Education seekers may be brought to the following academic responsibility for breach of academic integrity: repeated assessment of the corresponding type of learning activity.

***More detailed information about competencies, learning outcomes, teaching methods, assessment forms, self-study is given in the Course program***