Kyiv National University
of Construction and Architecture
Department _ of environmental
protection technologies
and labor protection

Cipher of specialty	Name of specialty, educational program	Cipher of educational component
G2	Technologies of environmental protection	VK05

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183	Technologies of environmental protection	VK05

« AFFIRM»
Head of Department
_____ /_ TKACHENKO T. /

Syllabus developer
_____ /_ KOTOVENKO O. /

SYLLABUS

Mathematical methods in ecology

(name, cipher of educational component

1) **Educational component status:** optional
2) **Teacher contact details** associate professor Kotovenko O., kotovenko.oa@knuba.edu.ua, +380674644709, http://www.knuba.edu.ua/?page_id=45372
3) **Pre-requisites:** higher mathematics, modeling and environment state forecasting, information technologies
4) **Discipline abstract:** The discipline study mathematical methods for solving problems of nature management, modeling and environmental state forecasting, the evolutionary technogenesis development, which arise in ecology in connection with anthropogenic environmental load.
5) **Course structure:**

Total number of credits ECTS	3
Sum of hours:	90
Individual task:	CGW
Final control form	test

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6) Course structure:

Lectures:

Topic 1. Mathematical methods of nonlinear equations approximate solution and their application in state environmental mathematical modeling
Topic 2. Methods of linear equations systems approximate solution and their application in environmental state mathematical modeling
Topic 3. Methods of nonlinear equations systems approximate solution and their application in environmental state mathematical modeling
Topic 4. Methods of numerical integration of ordinary differential equations and their application in environmental state mathematical modeling
Topic 5. Approximate solution a linear boundary value problem and its application in environmental state mathematical modeling
Topic 6. Methods of numerical solution partial differential equations and their application in environmental state mathematical modeling
Topic 7. Mathematical programming methods and their application in operation research models for solving environmental problems (rational nature management problems and environmental-economic problems)

Practical classes:

1	Numerical solution nonlinear equations
2	Numerical solution systems linear algebraic equations
3	Numerical solution systems nonlinear algebraic equations.
4	Numerical solution ordinary differential equations

Individual task:

CGW. Application approximate methods solving linear boundary value problems and numerical methods solving partial differential equations for specific ecological models

7) Link to the page of the electronic educational and methodological complex of the discipline:

http://org2.knuba.edu.ua/course/view.php?id=1599