



Syllabus

Course Program



Fundamentals of engineering calculations

Specialty

274 – Automobile transport

Educational program

Cars and automotive industry

Level of education

Bachelor's level

Institute

Institute of Education and Science in Mechanical Engineering and Transport

Department

Car and tractor industry (152)

Course type

Discipline of special (professional) training

Semester

1

Language of instruction

English, Ukrainian

Lecturers and course developers



Ostroverkh Oleksandr Olehovych

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Candidate of technical sciences, associate professor, associate professor of the Car and Tractor industry, department of National Technical University «KhPI»

Work experience - 14 years. Author and co-author of more than 50 scientific and methodical publications.

The courses: «Controllability and stability of the movement of cars and tractors», «Motor Cars Technical Operation, Autotechnical Assessment and Resource Saving», «Technology of constructions of self-propelled machines».

[More about the lecturer on the department's website](#)

General information

Summary

The course "Fundamentals of engineering calculations" is an introductory course for the basic disciplines necessary for the training of qualified engineering personnel in the field of training 274 "Motor Transport".

Course objectives and goals

The purpose of engineering calculations is to ensure the safety, reliability, and functionality of engineering objects and systems by analyzing their properties and behavior under load, as well as to optimize structures, identify potential hazards, and determine necessary measures to prevent accidents.

Format of classes

Lectures, laboratory work, calculation work, independent work, consultations. Final control - exam...

Competencies

ZK 6. Ability to use information and communication technologies.

ZK 9. Ability to work autonomously.

FC 15. Ability to apply mathematical and statistical methods of collecting, systematizing, summarizing and processing information.

RN 25. Present the results of research and professional activities to specialists and non-specialists, argue their position .

as examples from everyday life. In addition, to establish feedback with students and determine the degree of education of students on the topic of the lesson, they are involved in a conversation. In order to more firmly assimilate the material, a demonstration of animated videos is provided to acquire a visual representation of the design of units and assemblies and the principles of their application. The teacher involves students in the interview, explains the features of a particular design, its advantages and disadvantages. Independent work is an integral part of the assimilation of the material. Independent work is carried out when preparing an individual task, for modular tests, as well as to deepen the studied material according to the proposed literature..

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gears.

Topic 5. Methodological recommendations for performing graphic tasks

Topic 6. Some types of drawing books |

Topics of the workshops

Topic 1 USING MS EXCEL FORMULAS TO FIND THE AREA AND VOLUME OF SHAPES

Topic 2. MOTION. SPEED. ACCELERATION.

Topic 3. PERIODIC MOVEMENT. PENDULUM.

Topic 4. CAROUSEL. CIRCLE MOVEMENT.

Topic 5. ENERGY CONVERSION. |

Topics of the laboratory classes

Practical work within the discipline is not provided |

Self-study

Calculation work on the course "Fundamentals of engineering calculations" is provided for in the curriculum for specialty 274 "Motor Transport". The goal of the project is to consolidate the knowledge necessary for the analysis of car structures, their units and systems, as well as the ability to perform elementary calculations related to assessing the performance of given objects based on design calculations.. |

Course materials and recommended reading

Basic literature

- 1 Buda A. G. Projection drawing. Views, sections, cross-sections: textbook / A. G. Buda, O. V. Korol – Vinnytsia: VDTU, 2001. – 109 p..
- 2 Buda A. G. Design of forms of technical details and axonometric projections: a textbook / Buda A. G., Korol O. V., Pashchenko V. N. – Vinnytsia: VDTU, 2001. – 92 p..
- 3 Vanin V. V. Design documentation: textbook / Vanin V. V., Bliok A. V., Gnitetskaya G. O. – [3rd ed.]. – K.: Karavela, 2003. – 160 p..
- 4 Vanin V. V. Computer engineering graphics in the AutoCAD environment / Vanin V. V., Perevertun V. V., Nadkernychna T. O. – K.: Karavela, 2005. – 288 p.
- 5 Vyshnepolsky I. S. Technical drawing: учеб. for Prof. studies chief – / I. S. Vyshnepolsky – [5th edition, revised]. - M.: Higher. school, 2001. – 224 p.

Additional literature

- 1 Bogdanov V. M. Engineering graphics: a reference book / Bogdanov V. M., Verkhola A. P., Kovalenko B. D.; edited by A. P. Verkhola. – K.: Tekhnika, 2001. – 268 p..
- 2 Verkhola A. P. Engineering graphics: drawings, computer graphics: a textbook for students of higher educational institutions / Verkhola A. P., Kovalenko B. V., Bogdanov V. M.; ed. A. P. Verkhola. – K.: Karavela, 2005. – 304 p..
- 3 Levitsky V. S. Machine drawing and automation execution of drawings: учеб for university students - / Levytsky V. S. - [6th ed, trans. and additional]. - M.: Higher. Shk., 2004. - 435 p..
- 4 Mykhailenko V. E. Engineering graphics: a textbook for students of higher educational institutions of 1-2 accreditation levels / Mykhailenko V. E., Vanin V. V., Kovalev S. M. – K.: Karavela, 2002. – 284 p.
- 5 Pavlyshche V. T. Fundamentals of design and calculation of machine parts. / Pavlyshche V. T. – Lviv. : Afisha, 2004. – 578 p. |

Assessment and grading

Criteria for assessment of student performance, and the final score structure

Type of work	Number of points
Test 1	30
Test 2	30
Individual task	30
Exam	10
Total	100

Grading scale

Total points	National	ECTS
90–100	Excellent	A
82–89	Good	B
75–81	Good	C
64–74	Satisfactory	D
60–63	Satisfactory	E
35–59	Unsatisfactory (requires additional learning)	FX
1–34	Unsatisfactory (requires repetition of the course)	F

Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": show discipline, education, benevolence, honesty, responsibility. Conflict situations should be openly discussed in study groups with the teacher, and if it is impossible to resolve the conflict, it should be brought to the attention of the employees of the institute's directorate. Regulatory and legal support for the implementation of the principles of academic integrity of NTU "KhPI" is posted on the website: <http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/> |

Approval

Syllabus agreed

30.08.2025

Head of the department
Oleksiy REBROV

30.08.2025

Guarantor of the educational program
Andriy KOZHUSHKO