

MATHEMATICAL MODELING OF MOTOR VEHICLES

(course title)

COURSE SYLLABUS ABSTRACT

6-05-0715-03 - "Cars, tractors, mobile and technological complexes"

Profession: Computer engineering in the automotive industry

	Form of higher education
	Full-time (day)
Year	3
Semester	6, 7
Lectures, hours	34
Practical classes (seminars), hours	16
Laboratory classes, hours	16
Exam, semester	6
Course project, semester	7
In-class test (semester, hours)	66
Independent study, hours	42
Total hours in the academic discipline/credit units	108/3

1. Course outline

The purpose of studying the discipline "Mathematical modeling of motor vehicles" is to form students' knowledge, skills and abilities of mathematical modeling of technical systems and, on their basis, gain experience in setting and solving problems of functional design of mechanisms and car systems.

2. Course learning outcomes

Upon completion of the course, students will be expected to know:

- methods of mathematical modeling of technical systems and the possibility of their use for modeling car mechanisms;
- methods of analyzing the physical properties of technical systems, obtaining their deterministic and relative characteristics;
- methods of frequency and spectral analysis, correlation and regression analysis, experiment planning and obtaining experimental factor models;
- methods of unconditional and conditional optimization of technical systems parameters;

be able to:

- build mathematical models of mechanisms and systems of the vehicle: mechanical gears, friction clutches, torque converters, vibration protection systems, hydraulic drives of the mechanism control system;
- simulate and analyze static states, transient and probabilistic processes when driving in real road conditions;
- build experimental plans, conduct active computational experiments and obtain regression multifactor models;

- set and solve the problems of optimizing the parameters of mechanisms and systems of motor vehicles;
- to possess a skill:

- building mathematical models of mechanisms and systems of the car, modeling the processes of their functioning
- solving the problems of determining the parameters of mechanisms and systems of the car and their optimization on the basis of mathematical modeling.

3. Competencies*

Apply the methodological basis for designing autonomous vehicles

4. Requirements and forms of midcourse evaluation and summative assessment

Form of current certification - test.