UKRAINIAN STATE UNIVERSITY RAILWAY TRANSPORT

DEPARTMENT OF SPECIALIZED COMPUTER SYSTEMS APPROVED

Minutes of the meeting of the Department of Specialized Computer Systems

August 25, 2025 № 1

SYLLABUS FROM THE DISCIPLINE

II semesters of 2025-2026 academic year

INFORMATION SYSTEMS AND INFORMATION TECHNOLOGIES

Level of higher education: first (educational and scientific)

Degree of higher education: bachelor

Specialty: 123 Computer Engineering

Educational program: Specialized computer systems

Volume: 7 ECTS credits

Number of modules: 2 (4 content modules) 7 and 8 semesters

Reporting: test / exam

Time and audience of classes: According to the schedule - http://kart.edu.ua/osvita/portal-rz

Lecturer: Dotsenko Sergey Ilyich Doctor of Technical Sciences, Associate Professor

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Hours of reception and consultations: 13.00-14.00 Tuesday - Thursday

Location of the department: City of Kharkiv, Feuerbach Square, 7, 3rd building, 4th floor, 434 auditorium

Course web page: http://do.kart.edu.ua/

Additional information materials: http://metod.kart.edu.ua

PLANNED LEARNING OUTCOMES

Teaching the discipline "Information Systems and Information Technologies" is that the future master of information technology and management in railway transport to form the concept of modern information technology and computer networks that will ensure the formation of information systems in railway transport, know the software of this type of railway activity, approaches to the formation of automated technologies based on DSS (decision support systems), gained practical skills in using modern techniques and software.

The task of studying the discipline "Information Systems and Information Technologies" is: the use of modern software in the processing of operational information and the formation of DSS on the workstation of operational staff.

Do you have to choose this course?

If you are interested in the development and implementation of modern computer control systems for train traffic, control systems for responsible processes and production of national importance, if you want to get an interesting and high-paying job in Ukraine and abroad, where in recent years very high demand for specialists in specialized computer systems, then you need this course!

Applicants are expected to have: basic understanding of physics, mathematics of the basics of computer systems programming and controllers, knowledge of the basics of circuitry, methods of building computer systems architecture ..

Part of the course is devoted to the theory of computer network development and information technology. Much attention is paid to the study and mastery of methods of scientific organization of labor.

The teaching staff and our fellow producers will be ready to provide any assistance on the most difficult aspects of the course by e-mail and in person during working hours.

Course overview

The course is studied over two semesters and gives students a deep understanding of the problems of computer network design theory and information technology that arise in the early

stages of their life cycle, and provides a solid basis for rapid adaptation to the first job in Ukraine or Ukraine. countries near and far abroad.

The course consists of one lecture per week, one laboratory session for two weeks for the 1st semester and one lecture for two weeks and one laboratory session per week for the second semester. It is accompanied by text material, presentations, group and individual tasks. Students will have the opportunity to apply the acquired knowledge and solve practical problems during discussions in the classroom and the development of projects of their own local networks. The course includes lectures by invited employers (specialists of Radio Information Systems Ltd., INSOLAR Ltd.

Course topics

Module 1

Content module 1 Theoretical foundations of information technology

Topic 1. Technology: concepts, basic properties and processes.
Topic 2. Economic information and means of its formalized description
Topic 3. Information technology: properties, requirements, goals
Topic 4. Intelligent technologies of economic data processing
Topic 5. Creating data warehouses. OLAP and Data Mining technologies

Content module 2 Theoretical foundations of automated information technology

Topic 6. Information systems and technologies in modern society
Topic 7. Automated information systems for enterprises and organizations
Topic 8. Information technology in management
Topic 9. Decision making in management systems. Dynamic programming
Topic 10. Additional economic problems of dynamic programming
Topic 11. Information technology of computer networks
Topic 12. Technologies of the global Internet
Topic 13. Hypertext technologies

Module 2

Content module 3 Theoretical foundations of information systems

Topic 14. Basic concepts of information systems theory

Topic 15. Classification of information systems

Topic 16. The structure of the information process

Topic 17. Graphic models

Topic 18. Characteristics of information systems

Topic 19. Reliability of information systems

Topic 20. Calculation of reliability indicators

Topic 21. The structure of information systems

Topic 22. Stages of information systems development

Topic 23. Evaluation of the feasibility of creating an information system

Topic 24. Examples of information systems

Topic 25. Technical and software support of information systems

Topic 26. Design and creation of information systems

Topic 27. Sequence of creation of information systems at enterprises

Topic 28. Protection and security of information in information systems

INTERDISCIPLINARY RELATIONS

The discipline is based on the main provisions of the disciplines:

Higher mathematics

Physics

Engineering and computer graphics

Computer control systems

The discipline is the basis for the study of disciplines:

Software engineering

Computer systems for collecting and processing technological information

Technology and automation of device and computer systems design.

Program competencies

RZ. Ability to create system and application software for computer systems and networks.

P4. The ability to ensure the protection of information processed in computer systems and networks, especially for systems of critical purpose, in order to implement the established information security policy.

P5 Ability to use design automation tools and systems to develop components of computer systems and networks, Internet applications, cyber-physical systems, etc.

P6 Ability to design, implement and maintain computer systems and networks of various types and purposes

P8 Willingness to participate in works on the implementation of computer systems and networks, putting them into operation at objects of various purposes

P9 Ability to systematically administer, use, adapt and operate existing information technologies and systems

P10 Ability to organize workplaces, their technical equipment, placement of computer equipment, use of organizational, technical, algorithmic and other methods and means of information protection

List of educational components and their logical sequence

The program outcomes of the first (bachelor) educational level of the "bachelor" degree, specialty 123 "Computer engineering", which determine the normative content of training are:

Knowledge

N3. Know the latest technologies in the field of computer engineering.

N4. Know and understand the impact of technical solutions in the public, economic, social and environmental context.

N5. Have knowledge of the basics of economics and project management.

Skill

N7. To be able to solve problems of analysis and synthesis of means characteristic of the specialty.

N8. Be able to think systematically and apply creative abilities to the formation of new ideas.

N9. Be able to apply knowledge of technical characteristics, design features, purpose and rules of operation of software and technical means of computer systems and networks to solve technical problems of the specialty.

N11. Be able to search for information in various sources to solve computer engineering problems.

Additional program learning outcomes (according to the Educational program)

N22. To be able to apply the acquired knowledge and skills to solve the problems of the development of high-speed railway transport, increase its safety and competitiveness.

N23. Be able to develop, design and carry out maintenance of computer systems of railway automation and other systems of critical purpose in related industries.

EVALUATION RULES

When filling in the student's test report and test book (individual curriculum), the grade set on a 100-point scale must be transferred to the state scale (5, 4, 3,) and ECTS scale (A, B, C, D , IS)/

Determination of the name on the state scale (assessment)	Determination of the name on the ECT scales	**On a 100-point scale**	**ECTS rating**
EXCELLENT - 5	Excellent - excellent performance with only a small number of errors	90-100	A
GOOD - 4	Very good - above average with a few errors	82-89	B
	Good - in general, the right work with a number of gross errors	75-81	C
SATISFACTORY - 3	Satisfactory - not bad, but with many shortcomings	69-74	D
	Enough - the performance meets the minimum criteria	60-68	E
Unsatisfactory - 2	Unsatisfactory - you need to work before getting a test or exam (without re-studying the module)	35-59	FX
	Unsatisfactory - serious further work required (re-study of the module)	<35	P

Dotsenko Serhiy Ilyich (http://kart.edu.ua/kafedra-ckc-ua/kolectuv-kafedru-sks-ua/butenko-vm-ua?id=3275) - lecturer in computer systems and information technology. He received a degree in Ph.D. in specialty 05.13.06 information technology in 2017 at KhNUMG. OHM. Бекетова. Areas of research: cybernetic systems, intelligent information technology, security of computer systems.

Code of Academic Integrity

Violation of the Code of Academic Integrity of the Ukrainian State University of Railway Transport is a serious violation, even if it is unintentional. The Code is available at: http://kart.edu.ua/documentu-zvo-ua

In particular, compliance with the UkrDUZT Code of Academic Integrity means that all work on exams and tests must be performed individually. While working independently, students can consult with teachers and other students, but must solve problems on their own, guided by their own knowledge, skills and abilities. References to all resources and sources (for example, in reports, independent papers or presentations) should be clearly identified and properly documented. In the case of working together with other students on individual tasks, you should indicate the degree of their involvement in the work.

Integration of students with disabilities

Higher education is a leading factor in raising social status, achieving spiritual, material independence and socialization of young people with disabilities and reflects the state of development of democratic processes and humanization of society.

To integrate students with disabilities into the educational process of the Ukrainian State University of Railway Transport, a distance learning system based on modern pedagogical, information and telecommunication technologies has been created.

Access to distance learning materials from this course can be found at: http://do.kart.edu.ua/