Ukrainian State University of Railway Transport

Recommended
at a meeting of the department
specialized computer systems
prot. . № 1 dated 25.08.2025

SYLLABUS FROM THE DISCIPLINE HUMAN-MACHINE INTERFACE

I I semester 2025-2026 academic year

educational level first (bachelor)
field of knowledge 12 Information technologies
specialty 123 Computer Engineering
educational program Specialized Computer Systems (SCS)

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

TEACHING TEAM

Lecturers: Dotsenko Sergey Ilyich (lecturer)

Contacts: 38 (057) 730-10-61, e-mail: sirius_3k3@ukr.net
Lecturer's assistants:

Hours of reception and consultations: 13.00-14.00 Tuesday - Thursday
Course web pages:
Course web page:
Additional information materials:

Teaching the discipline "Human-Machine Interface" is to study modern scientific concepts, concepts, principles, tools and technologies used in the development of software interface information, intelligent and real-time systems.

The main tasks of studying the discipline "Human-Machine Interfaces" are:

- study of the basics of the processes of human perception and learning;
- mastering the standards and principles of designing an ergonomic application interface;
- study the main aspects of programming graphical user interfaces (GUI);
- study and use in practice of various methods of testing interfaces.

As a result of studying the discipline, the specialist must know:

- basic principles of human-machine interaction,
- conceptual models and templates of the user interface;
- features of human perception of information;
- features of construction and modes of dialogue;
- issues of computer presentation and visualization of information;
- user interface architecture;
- stages of user interface development;
- criteria for evaluating the usefulness of dialog systems.

A trained specialist must be able to:

- build and describe the user interface, performing analysis, design and prototyping of human-machine interface;
- use the tools of human-machine interface development;
- skillfully apply the principles of visual perception of information by the user;
- to quantitatively assess the quality of the human-machine interface.

Have an idea of the prospects for the development of basic types of human-machine interfaces.

6 credits / 180 hours of ECTS are allocated for the study of the academic discipline

Why should you 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 in the future interesting and highly paid work in Ukraine and

abroad, where in recent years place a 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 database development. Much attention is paid to the study and mastery of methods of scientific organization of labor. To do this, each applicant in practical classes develops their own databases with automated workstations "Workstation - student", the architecture model of which is based on the open architecture of the knowledge model. This provides the acquisition of skills of scientific organization of the applicant's work at the stage of his training.

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 one semester and gives students a deep understanding of the problems of database design theory that arise in the early stages of the database life cycle and ways to solve them, 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, one laboratory and a practical lesson for two weeks. 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 "student workstation". The course includes lectures by invited employers (specialists of Radio Information Systems Ltd., INSOLAR-CLIMATE Ltd.).

COURSE TOPICS

Module 1.

Content module 1 Theoretical foundations of human-machine user interface

TOPIC 1. FUNDAMENTALS OF USER INTERFACE DESIGN

1.1. The concept of user interface

1.2. Features of user interface design

1.3. UI styles

1.4. User interface models

1.5. The team of UI developers

TOPIC 2. USER INTERFACE DESIGN RULES

2.1. Analysis of ergonomic and human factors in custom design

interface

2.2. The basic rule of user interface design

2.3. Rule 2: Reduce the load on the user's memory

2.4. Rule 3: make the interface compatible

TOPIC 3. PLANNING OF WORKS ON DESIGN AND DEVELOPMENT OF USER INTERFACE

3.1. Planning work on creating a user interface

3.2. Choice of software development model

3.3. Management and technical approaches

3.4. Calendar planning. Detail of the plan

TOPIC 4. REQUIREMENTS, STANDARDS AND GUIDING PRINCIPLES FOR DESIGNING USER INTERFACE

4.1. Requirements and standards

4.2. Guidelines and guidelines for style

4.3. Problems of designing international interfaces

Module 2. Content module 2 Methods of user interface development

TOPIC 5. USERS, THEIR WORKING ENVIRONMENT AND TASKS

5.1. Product users, their work and environment

5.2. Methods of collecting information about users

5.3. Conceptual design

TOPIC 6. LAYOUTS, MODELS AND PROTOTYPES OF USER INTERFACES

6.1. Models, models and prototypes

6.2. Objectives of project visualization

6.3. Methods of materialization of design decisions

6.4. Rejection of prototypes

TOPIC 7. GRAPHIC USER INTERFACE

7.1User interface and operating systems

7.2 Command line interface

7.3 Menu interfaces

7.4 Basic properties of the graphical user interface

7.5. Graphical user interface architecture

2 PLANNED LEARNING OUTCOMES

Ability to abstract thinking, analysis and synthesis.

Ability to learn and master modern knowledge

Ability to identify, pose and solve problems

Ability to apply the legal and regulatory framework, as well as national and international requirements, practices and standards in order to carry out professional activities in the field of computer engineering

Ability to use design automation tools and systems to develop components of computer systems and networks, Internet applications, cyberphysical systems, etc.

Ability to identify, classify and describe the work of software and hardware, computer and cyberphysical systems, networks and their components through the use of analytical and modeling methods.

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 the ECTS scale (A, B, C, and , D)

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 Sergey Ilyich http://kart.edu.ua/kafedra-ckc-ua/kolectuv-kafedru-sks-ua/butenko-vm-ua?id=3275 - lecturer on information technologies. He received a degree of 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 the following links: http://kart.edu.ua/documentu-zvo-ua

In particular, compliance with the Code of Academic Integrity of the Ukrainian DUZT means that all work on exams and tests must be performed individually. During independent work, students can consult with teachers and other students, but must solve problems independently, 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: https://do.kart.edu.ua