МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ХАРКІВСЬКИЙ НАЦІОНАЛЬНИЙ ЕКОНОМІЧНИЙ УНІВЕРСИТЕТ
ІМЕНІ СЕМЕНА КУЗНЕЦЯ

ЗАТВЕРДЖЕНО
на засіданні кафедри
інформаційних систем.
Протокол № 1 від 27.08.2024 р.

ПОГОДЖЕНО
Проректор з навчально-методичної роботи

_____ Каріна НЕМАШКАЛО

ОСНОВИ МЕТОДОЛОГІЇ ТА ОРГАНІЗАЦІЇ НАУКОВИХ ДОСЛІДЖЕНЬ

робоча програма навчальної дисципліни (РПНД)

Галузь знань	**12 "Інформаційні технології"**
Спеціальність	**126 "Інформаційні системи та технології"**
Освітній рівень	**другий (магістерський)**
Освітня програма	**Інформаційні системи та технології**

Статус дисципліни	**обов'язкова**
Мова викладання, навчання та оцінювання	**англійська**

Розробник(и):
д.пед.н, к.техн.н,
професор — підписано КЕП — Олександр КОЛГАТІН

Завідувач кафедри
інформаційних систем — _____ — Дмитро БОНДАРЕНКО

Гарант програми — підписано КЕП — Олександр КОЛГАТІН

Харків
2024

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SIMON KUZNETS KHARKIV NATIONAL UNIVERSITY OF ECONOMICS

APPROVED
at the meeting
of the Information Systems Department
Protocol № 1 of 27.08.2024

AGREED
Vice-rector for educational and methodical work

_____ Karina NEMASHKALO

BASICS OF METHODOLOGY AND ORGANISATION OF SCIENTIFIC RESEARCH

Programme of the course

Field of knowledge	**12 "Information Technologies"**
Specialty	**126 "Information Systems and Technologies"**
Study cycle	**second (master)**
Study programme	**Information Systems and Technologies**

Course status	**mandatory**
Language	**English**

Developers:
Doctor in Pedagogics, Professor — digital signature — Oleksandr KOLGATIN

Head of Information Systems Department — _____ — Dmytro BONDARENKO

Head of Study Programme — digital signature — Oleksandr KOLGATIN

Kharkiv
2024

INTRODUCTION

Elements of scientific research are inherent in any creative person activity, the activity of a specialist in the field of information systems and technologies is no exception. Modern economic conditions of business require specialists, regardless of their specialisation, to be competent in reviewing professional literature, analysing existing achievements in the field, selecting and analysing prototypes of project activities. In view of the orientation of the economy and society of Ukraine to the global level of scientific, technical and social achievements, to joining the family of the global civilised society, the issues of methodology and organisation of scientific research are considered in an international context, therefore it was decided to teach this course in English. The basics of scientific methodology and the social significance of science are the subject of the first module of the course. Considerable attention is paid to culture and integrity in the field of science. The presentation of scientific results is considered in the context of the application of information technologies, international and national standards that are used in Ukraine. The second content module is aimed at methods of interaction between scientists, approbation of research results, comprehensive use of the latest information technologies for information search and organisation of scientific conferences. The proposed course has practical orientation, a significant number of laboratory classes allow students to practise the skills of using specialised software, which is aimed at supporting scientific activity.

The purpose of the course is formation of students' worldview on issues of modern science and acquisition of skills in the practical application of information technologies, information systems and publicly available resources for the implementation of elements of scientific research as a component of professional activity in the field of information systems and technologies.

The objectives of the course are:

– studying of the organisational foundations of science as a part of universal culture of humanity;
– mastering the basic principles and rules of scientific research;
– development of the skills to work with sources of scientific information;
– mastering the basics of scientific documentation;
– acquisition of competencies in scientific conferences participation;
– mastering of the main principles and rules of scientific conferences organisation;
– acquisition of competencies in scientific conferences participation;
– mastering of the main principles and rules of scientific conferences organisation;
– developing ken on modern scientific community;
– improving practical skills in English as a language of scientific international communication.

The object of the course is scientific research process.

The subject of the course is the practical concepts, culture and technologies of scientific research in the field of information systems and technologies.

The learning outcomes and competencies formed by the course are defined in table 1.

Table 1

Learning outcomes and competencies formed by the course

Learning outcomes	Competencies
LO01.	Integral Competence GC01 GC02 SC08
LO02.	GC02
LO07.	GC01
LO08.	GC01
LO11.	GC01 GC02

LO01. Searching for necessary information in scientific and technical literature, databases, other sources, analyse and evaluate this information.
LO02. Communicating freely in national and foreign languages in scientific, industrial and social spheres of activity.
LO07. Making a grounded choice of project solutions and design a service-oriented information architecture of the enterprise (institution, organisation, etc.).
LO08. Developing models of information processes and systems of various classes, to use methods of modelling, formalisation, algorithmization and implementation of models using modern computer tools.
LO11. Solving the problems of digital transformation in new or unknown environments based on specialised conceptual knowledge, including modern scientific achievements in the field of information technology, researches and integration of knowledge from various fields.
Integral Competence. The ability to solve problems of a research and innovation nature in the field of information systems and technologies.
GC01. Ability to abstract thinking, analysis and synthesis.
GC02. Ability to communicate in a foreign language.
SC08. Carry out reengineering of applied information systems and business processes.

COURSE CONTENT

Content module 1: Fundamentals of Scientific Research

Topic 1. Science as a Part of Universal Culture of Humanity

The purpose and tasks of the discipline, its place in the educational process. Historical information about the development of computer science.
Basic concepts of scientific research. Peculiarities of choosing a research topic. Classification of scientific specialties in the world and in Ukraine. The purpose of the research and its connection with the scientific specialty. The object of research as a

phenomenon or process that gives rise to a problem. The subject of research as a component of the object to which scientific research is directed. Research hypothesis and methods of its verification. Scientific result, meaning positive and negative scientific result for science.
Theory and experiment, their unity and relations. Methods of scientific research. Theoretical and experimental methods. Statistical methods of testing scientific hypotheses. Methodological approaches.
Scientific ethics and integrity. Intellectual property in scientific research. Prevention of violations of norms of scientific integrity.

Topic 2. Sources of Scientific Information
Classification of scientific information sources. Printed and electronic editions. Scientific journals. Scientific conferences proceedings. Scientometric databases. Full-text scientific databases. Open libraries. Websites of universities and scientific institutions. Repositories of universities. National libraries and bibliographical sources of Ukraine.
Status of a scientific journal and scientific publication in Ukraine and in the world. The concept of peer-reviewed publications. The impact factor of a scientific journal. The concept of the List of scientific specialised publications of Ukraine, in which the results of dissertations for obtaining the scientific degrees of Doctor of Science, Candidate of Science and Doctor of Philosophy can be published.
Specialised search systems that are used to search for scientific information.
Used sources citing. International and Ukrainian citation standards (DSTU 8302-2015, APA, MLA, Chicago/Turabian, IEEE, Harvard, Oxford, etc.)

Topic 3. Basics of Scientific Documentation
Classification of scientific documents. International and national standards of scientific documents design.
Designing a scientific publication. Types of scientific publications and requirements for them (review article, brief information about ongoing research, full research article about completed scientific research). Structure of a scientific article. Abstract as a concise presentation of the content of the article for placement in reference databases. Keywords as a model of scientific material for automated search engines. Introduction as a mandatory structural component of a scientific article. A problem that is being solved. Justification of topicality. Analysis of experience in the field of research. Purpose and objectives. Requirements for submitting the main part of the material depending on the type of publication. Requirements for submitting information about the theoretical background, models, description of the conditions of conducting experimental work, experimental results, analysis of the results obtained. Conclusions and prospects for further research as a mandatory components of a scientific article. Theses of the report at the scientific and practical conference as a separate type of scientific publication.
Standards for the design of scientific documentation text.

Content module 2: Scientific Community and ICT Tools for Scientific Communication

Topic 4. Scientific Conference Organization

Scientific conference as the activity for scientific communication and discussion of scientific results. Determination of the topic and circle of potential participants of the scientific conference. The purpose and tasks of the scientific meeting. Approaches to financing the conference. Scientific associations and universities as holders of scientific conferences. The Ministry of Education and Science of Ukraine as the founder of scientific conferences. Sponsors and conference fee. Plenary session, sections, workshops.

Organisational and program committees of the scientific conference. Principles of program committee formation. Forms of participation in the scientific conference, plenary report, sectional report, short message at the section, poster report. Preliminary review of the proposed reports as a guarantee of the conference authority and the high status of the materials published as conference results. Principles and organisational procedure of reports selection for the conference.

Internet resources and specialised software to support the activities of organisational and program committees of scientific conferences.

Topic 5. Scientific Conference Participation

Sources of information about scientific conferences. Selection of a conference for approbation of scientific research results. Submission of application and materials for the conference. Deadlines for materials submission and their compliance. Content of the material presented for participation in the conference. The concept of sections, the principles of choosing a section for participation in a scientific conference. Choosing a form of participation in the conference. Scientific novelty as a guarantee of high evaluation of report materials. The principles of academic integrity as an integral condition for the researcher authority and recognition in the scientific community.

Participation in the peer review of reports that were submitted to the conference, criteria for evaluating reports. Avoiding conflicts of interest during peer review of submissions.

Preparation of materials for the report. Making a presentation. Recommendations for the presentation.

Ethics of scientific discussion. The regulation of the speech and its observance. Ethics of questions to the speaker, ethics of answers. Culture of scientific speech.

Software to support participation in scientific conferences. Internet resources that help to find a conference according to the specified field of research.

Topic 6: Scientific Communities

Sources of information about scientific communities. The importance of scientific communities in the development of international standards for the presentation of scientific results, data transfer protocols, information system interfaces, organisation

of training and professional development, and determination of the principles of scientific ethics.

The list of laboratory studies in the course is given in table 2.

Table 2

The list of laboratory studies

Name of the topic and/or task	Content
Topic 1 Task 1	Analysing the role of Science as a Part of Universal Culture of Humanity
Topic 2 Task 2	Searching the Scientific Information According to Given Competences and Study Results
Topic 3 Task 3	Preparing Scientific Document in the field of Information Systems and Technologies
Topic 4 Task 4	Modelling Scientific Conference Organization Process
Topic 5 Task 5	Using Specialized Software to Participate Scientific Conference
Topic 5 Task 6	Modelling Scientific Conference Venue
Topic 6 Task 7	Analysing Scientific Communities Internet Resources

The list of self-studies in the course is given in table 3.

Table 3

List of self-studies

Name of the topic and/or task	Content
Topic 1-6	Search, selection and review of literature on a given topic
Topic 1-6	Preparing the report on the given topic
Topic 1-6	Performing an individual task (presentation)

The number of hours of lectures, practical (seminar) studies and hours of self-study is given in the technological card of the course.

TEACHING METHODS

In the process of teaching the course, in order to acquire certain learning outcomes, to activate the educational process, it is envisaged to use such teaching methods as:
Verbal (lecture-discussion (Topic 1–6), lecture-dialog (Topic 1–6)).
Visual (demonstration (Topic 1–6), illustration (Topic 1–6)).
Practical (laboratory work (Topic 1–6), presentation, speaking in front of the audience (Topic 1, Topic 5), business game (Topic 4, 5)).

FORMS AND METHODS OF ASSESSMENT

The University uses a 100-point cumulative system for assessing the learning outcomes of students.
Current control is carried out during lectures, practical, laboratory and seminar classes and is aimed at checking the level of readiness of the student to perform a

specific job and is evaluated by the amount of points scored:
- for courses with a form of semester control as grading: maximum amount is 100 points; minimum amount required is 60 points.

The final control includes current control and assessment of the student.

Semester control is carried out in the form of grading.

The final grade in the course is determined:

– for disciplines with a form of grading, the final grade is the amount of all points received during the current control.

During the teaching the course, the following control measures are used:
Current control: proving the laboratory work (70 points); current assessment (30 points).
Semester control: Grading.
More detailed information on the assessment system is provided in the technological card of the course.

RECOMMENDED LITERATURE

Main

1. Наказ Міністерства освіти і науки України 12.01.2017 № 40 “Про затвердження Вимог до оформлення дисертації” із змінами, внесеними згідно з Наказом Міністерства освіти і науки № 759 від 31.05.2019. – Режим доступу : https://zakon.rada.gov.ua/laws/show/z0155-17#Text.
2. UNESCO Recommendation on Open Science (2021). – Режим доступу : https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en pp. 17-18.
3. Пушкар О. І. Методологія та організація наукових досліджень [Електронний ресурс] : навч. посіб. / О. І. Пушкар ; Харківський національний економічний університет ім. С. Кузнеця. - Електрон. текстові дан. (9,76 МБ). - Харків : ХНЕУ ім. С. Кузнеця, 2020. - 866 с. : іл. - Загол. з титул. екрану. - Бібліогр.: с. 849-852. http://repository.hneu.edu.ua/handle/123456789/23346.
4. Методичні рекомендації до оформлення звітів, курсових проєктів та дипломних робіт (проєктів) для студентів спеціальності 121 "Інженерія програмного забезпечення", 122 "Комп'ютерні науки", 126 "Інформаційні системи і технології": [Електронне видання] / уклад. І.О.Ушакова, Г.О. Плеханова, О.М. Беседовський. – Х.: ХНЕУ ім. С. Кузнеця, 2021. – 48 с. – Режим доступу : http://www.repository.hneu.edu.ua/handle/123456789/27413.

Additional

5. Рекомендації щодо запобігання академічному плагіату та його виявлення в наукових роботах (авторефератах, дисертаціях, монографіях, наукових доповідях. статтях тощо). URL: https://zakon.rada.gov.ua/rada/show/v8681729-18.
6. Kolgatin O., Kolgatina L. and Ponomareva N. Stochastic process computational modeling for learning research // Educational Dimension. 2022. Jun. 2022. DOI : https://doi.org/10.31812/educdim.4498.

7. Fundamentals of Research Methods and Importance of Scientific Basis for Research // Edubirdie. – 2022, February 27. – Access mode : https://edubirdie.com/examples/fundamentals-of-research-methods-and-importance-of-scientific-basis-for-research/.
8. What Are the Different Types of Scientific Research? – Access mode : https://akjournals.com/page/types-of-scientific-research
9. Open Science in the scientific community. – Access mode : https://akjournals.com/page/open-science.
10. March S. T., Smith G. F. Design and natural science research on information technology. – Access mode : https://www.researchgate.net/publication/222484351_Design_and_Natural_Science_Research_on_Information_Technology.

Information resources

11. Scopus. – Access mode : https://www.scopus.com.
12. Google Scholar. – Access mode : https://scholar.google.com/.
13. Easy Chair. – Access mode : https://easychair.org/.
14. Web of Science. – Access mode : https://www.webofscience.com/wos/woscc/basic-search.
15. ORCID. – Access mode : https://orcid.org/.
16. Personal Learning System “Basics of Methodology and Organisation of Scientific Research”. – Режим доступу : https://pns.hneu.edu.ua/course/view.php?id=9526.