Syllabus
Course Program

Methodology of Scientific Research

Specialty
073 – Management

Institute
Institute of Education and Science in Economics, Management and International Business

Educational program
Business administration (in English)

Department
Management (204)

Level of education
Master's level

Course type
Mandatory, general training

Semester
2

Language of instruction
English

Lecturers and course developers

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PhD in Physics & Mathematics, Master's degree in Management, associate professor, associate professor of Management department

Authored and co-authored over 130 scientific publications. Teaches courses: «Organization theory», «Managerial decisions», «Marketing management», «Social responsibility and business ethics», «Methodology of scientific research»
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General information

Summary

The course introduces students to the philosophical foundations of science, the nature and principles of scientific research, the specificity of research in social sciences, approaches to planning and conducting research, methods of data collection, processing, and analysis, forms of presenting research results. The course emphasizes the importance of adhering to the principles of academic integrity in research activities. The ultimate goal of the course is to help students develop the ability to carry out an independent research project and effectively communicate its results.

Course objectives and goals

• to help students develop the ability to plan and conduct a research project and present its results;
• to instill in students values and principles of academic integrity;
• to familiarize students with methods of qualitative and quantitative data collection used in social sciences;
• to equip students with methods of quantitative data analysis

Format of classes

Lectures, workshops, self-study. The course ends with a final exam

Competencies

GC01. The ability to conduct research at the required level
GC07. The ability for abstract thinking, analysis and synthesis.
SC09. The ability to analyze and structure organizational problems, make effective organizational decisions and ensure their implementation

Learning outcomes

LO01. To critically assess, select, and use appropriate scientific, methodological and analytical tools for managing under conditions of unpredictability

Student workload

The total volume of the course is 90 hours (3 ECTS credits): lectures - 16 hours, workshops - 16 hours, self-study - 58 hours.

Course prerequisites

Before studying this course, students are expected to have completed the course "Information systems and technologies in management"

Features of the course, teaching and learning methods, and technologies

Interactive lectures with presentations, discussion-based learning, multiple-choice tests, a paper (essay) on a topic related to the course topics, presentation of the paper in class, student-peer feedback, data analysis using MS Excel spreadsheets

Program of the course

Topics of the lectures

Topic 1. Philosophy and methodology of science
1. Science and its role in modern society. 2. Research paradigms. 3. The logic of scientific method. 4. The criteria of scientific knowledge. 5. Forms of scientific knowledge. 6. Empirical research methods. 7 Theoretical research methods. 8. Types of scientific research.
Topic 2. The specificity of scientific research in social science
1. Classifications of sciences. Criteria used to classify sciences. 2. Natural vs. social sciences. 3. Major challenges of research in social science as compared with natural sciences. 4 Research methods used in social sciences.
Topic 3. Scientific research process: planning, conducting, presenting the results
1. Steps in the process of planning and carrying out a research project. 2. Research problem. Research goal. Research question. Research hypothesis. Object and subject matter of research. 3 Literature review. 4. Scientific novelty of results. 5. Presentation of the research results. 6. Academic style of writing.
Topic 4. Scientific ethics
1. Fundamental principles and concepts of scientific ethics. 2. Special ethical issues in social science. 3. Misconduct in science. 4. Plagiarism and guidelines for ethical writing. 5. Proper referencing and citing of the sources.
Topic 5. Data collection methods in social science
1. Types of data used in social sciences. Primary and secondary data. Quantitative and qualitative data. 2. Qualitative data collection techniques: in-depth interviews, focus-groups. 3. Quantitative data collection techniques: observations, surveys and experiments.
Topic 6. Measurements in social science
1. Criteria for evaluating a measurement system. 2. Types of scales used for measurements in social sciences and types of mathematical treatment they allow. 3. Questionnaires as instruments for data collection.
Topic 7. Sample design and sampling procedures
1. The sampling procedure. 2. Probability sampling techniques. 3. Non-probability sampling techniques. 4. Random sampling error. 5. Determination of sample size.

Topic 8. Data analysis
1. The general procedure of testing the statistical significance of differences. Type I and type II errors.
2. Methods of testing for statistical significance. 3. Correlation analysis. 4. Regression analysis.

Topics of the workshops

Topic 1. Philosophy and methodology of science
1. Discussing reading assignments on the scientific method. 2.The demarcation problem: the criteria of scientific knowledge. 3. Positivism, constructivism, pragmatism as research paradigms. 3. Empirical and theoretical knowledge. 4. Deductive and inductive reasoning. 5. Modelling in science.
Topic 2. The specificity of scientific research in social science
1. Classifications of sciences. 2. Integration of sciences. 3. Natural vs. social science: qualitative differences. 4. Challenges of empirical research in social science. 5. Business research and economics.
Topic 3. Scientific research process: planning, conducting, presenting the results
1. A literature review and its role in scientific research. 2. The use of search engines for a literature review. Google Scholar. 3. Digital object identifier. Universal Decimal Classification. 4. Presentation of the research results. Academic articles. Participation in scientific conferences. 5. A master's thesis as a research project. 6. Practicing literature search using the Google Scholar search engine.
Topic 4. Scientific ethics
1. The role of academic integrity in the development of science. 2. Misconduct in science. 3. Plagiarism and guidelines for ethical writing. 4. Case studies on ethical conduct in science. 5. Discussing the Code of Ethics of Academic Relations and Integrity of NTU "KhPI" and its main provisions.
Topic 5. Data collection methods in social sciences
1. Primary and secondary data collection. The data quality assessment. 2. Observations: types, advantages, limitations. 3. Surveys: classifications, advantages, limitations, sources of errors.
4. Experiments: designs, sources of errors, internal and external validity. 5. Discussing an article on mixed method research.
Topic 6. Measurements in social science
1. Types of scales used for measurements in social science (nominal, ordinal, interval, ratio). 2. Measures of central tendency for data measured using different types of scales. 3. Questionnaire design.
4. Developing a questionnaire for a survey. 5. Evaluating a questionnaire provided by the course instructor.
Topic 7. Sampling procedures
1. Probability versus nonprobability sampling. 2. Estimating the sample size. 3. Calculating the confidence interval for means and for proportions. 4. Practicing the use of statistical functions in Excel spreadsheets.
Topic 8. Statistical analysis of data
1. Testing for statistical significance of differences and deviations: sampling statistics, chi-square analysis, analysis of variance. 2. Correlation and regression analysis of data using Excel spreadsheets.

Topics of the laboratory classes

No laboratory classes in this course

Self-study

Guidelines for master's thesis preparation.

A paper (essay) on a topic related to the course program. The paper size is 15-20 pages. The paper should be properly structured, written using an academic style of writing and based on at least eight different sources of information. All sources should be properly cited. The student should prepare a 7- to 10-minute presentation of the paper in class and be ready to answer the questions on the paper.

Course materials and recommended reading

1. Bell J., Waters S. Doing Your Research Project: A Guide for First-Time Researchers, 6th Edition / Mac Graw Hill Education, 2014. - 267 p.
2. Iacobucci D., Churchill G. A. Marketing Research: Methodological Foundations, 12th Edition / Nashville, TN: Earlie Lite Books, Inc., 2018. - 544 p.

3. Sharan B. Merriam. Qualitative Research: A Guide to Design and Implementation, 4th Edition / John Wiley & Sons, 2015. - 368 p.
4. Creswell J. W. Research Design: Qualitative, Quantitative and Mixed Methods Approaches, 4th Edition / SAGE Publications, Inc. 2014. – 273 p.
5. Sekaran U. and Bougie R. Research Methods for Business: A Skill-Building Approach, 7th Edition / Wiley & Sons, West Sussex, 2016, - 420 p.
6. Zikmund W.G., Babin B.J., Carr J. C., Griffin M. Business Research Methods, 8th Edition / South-Western College Pub, Cincinnati, OH, 2009. – 668 p.
7. Pruzan P. Research Methodology: The Aims, Practices and Ethics of Science / Springer, 2016. – 326 p.
8. Walliman N. Research Methods: the Basics. 3rd Edition / Routledge, 2021.
9. Michael J Crotty. The Foundations of Social Research / SAGE Publications Ltd., 2015. -256 p.
10. Тимошенков, І. В., Сідоров, В. І., Нащекіна, О. М. Основи наукових досліджень: методологія і практика : навчальний посібник для студентів економічних спеціальностей / І. В. Тимошенков, В. І. Сідоров, О. М. Нащекіна ; за заг. ред. д. е.н. І. В. Тимошенкова. – Х. : ХНУ імені В. Н. Каразіна, 2019. – 229 с.
11. Campbell F., Tricco A.C., Munn Z. et al. Mapping reviews, scoping reviews, and evidence and gap maps (EGMs): the same but different— the “Big Picture” review family // Systematic Reviews. – 2023. – Vol. 12. – article # 45. URL: https://doi.org/10.1186/s13643-023-02178-5
12. Kraus S., Breier M., Lim W.M. et al. Literature reviews as independent studies: guidelines for academic practice // Review of Management Science. – 2022. – Vol. 16. – P. 2577–2595. URL: https://doi.org/10.1007/s11846-022-00588-8
13. Christou E., Parmaxi A., Zaphiris P. A systematic exploration of scoping and mapping literature reviews // Universal Access in the Information Society. - 2024. URL: https://doi.org/10.1007/s10209-024-01120-3
14. The Code of Ethics of Academic Relations and Integrity of NTU “KhPI”. URL: https://blogs.kpi.kharkov.ua/v2/quality/wp-content/uploads/sites/25/2024/04/KODEKS-ETYKY-NTU-HPI.pdf
15. William Strunk, Jr. The Elements of Style. URL: http://www.bartleby.com/141/.
16. Galvan J. L. Writing Literature Reviews A Guide for Students of the Social and Behavioral Sciences. Sixth Edition / Routledge, Taylor & Francis Group, London and New York, 2017. – 181 p.
17. Aliotta M. Mastering academic writing in the sciences: a step-by-step guide / CRC Press, Taylor & Francis Group, Boca Raton, FL, 2019. –178 p.
18. Universal Decimal Classification. Summary. URL: https://udcsummary.info/php/index.php?lang=en&pr=Y
19. A manual for master's thesis preparation (the structure and formatting requirements) / укл. О.В. Прохоренко, О.М. Нащекіна, В.І. Ковшик, Н.М. Солопун – Х.: НТУ «ХПІ», 2024. – 45 с.

Assessment and grading

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

100% final grade is composed of
• 25 % - the final exam (two theoretical questions and one practical task)
• 75 % - continuous assessment, which includes:
- two multiple choice tests (30%)
- an individual written assignment (paper) and its presentation in class (30%);
- solving problems on data analysis in class (15%)

A regular meaningful participation in class discussions can substitute for the final exam (25%)

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": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.
Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

Approval

Approved by

Head of the department
Olena PROKHORENKO

August 28, 2024

Guarantor of the educational program

Pavlo BRIN

August 28, 2024