Research Methods

COURSE OUTLINE

SCHOOL	Engineering		
DEPARTMENT	Information and Electronic Engineering		
PROGRAM OF STUDY	Postgraduate		
COURSE CODE	MB103	**SEMESTER**	1st
COURSE TITLE	Research Methods		
TEACHING ACTIVITIES		**TEACHING HOURS**	**ECTS**
Lectures and Practical Exercises		3	7.5
COURSE TYPE	Science Area, Skills Development		
CORE COURSE AS PREREQUISITIVE:	No		
LANGUAGE OF TEACHING AND ASSESSMENT:	Greek		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBPAGE (URL)	https://exams-iee.the.ihu.gr/course/view.php?id=98		

LEARNING OUTCOMES

Learning Outcomes

Upon completing the course, students are expected to apply the knowledge acquired during their studies so that they can promptly address the research problems that may arise during the completion of their postgraduate thesis. Additionally, they will be prepared for any further studies aimed at obtaining a PhD/doctoral degree. Upon successful completion of the course, students will be able to:

- Analyze and critically assess scientific research methods and approaches
- Develop critical thinking skills
- Understand various scientific methods and apply them in different research projects
- Design a research project and select appropriate implementation methods
- Develop effective communication skills for presenting research results in both the Greek and English language (either in written form or through oral presentations)
- Grasp basic concepts related to innovation and entrepreneurship
- Describe the code of research and scientific ethics
- Understand and address ethical issues that arise during a research project

General Skills

- Searching, analyzing, and synthesizing data and information using the necessary technologies
- Adaptation to new situations
- Decision-making
- Individual work
- Cooperative work

- Work in international environment
- Work in interdisciplinary environment
- Generation of new research ideas
- Project Design and Management
- Promotion of free, creative, and inductive thinking

COURSE CONTENT

- Scientific research: Basic and applied research, research methodology and the research process, phases and stages of scientific research.
- Data collection and analysis: Methods of qualitative and quantitative research. Field research, action research, case study. Basic concepts of population, sample, sampling, accuracy, impartiality, reliability. Statistical processing of quantitative data using software tools.
- Evaluation and use of bibliographic sources: Methodology for searching and evaluating bibliographic sources. Study, organization and recording of bibliographic sources using modern online tools. Standard methods for presenting literature in scientific articles and texts (IEEE/Harvard/APA).
- Plagiarism issues: Research ethics and academic ethics. Legal framework and intellectual property rights. Types of plagiarism and avoidance methods. Use of artificial intelligence and related software in scientific research.
- Research projects and actions: International framework for publishing results (scientific journals/conferences/workshops), prestige and scope of publication media, access methods (subscription/open access). Evaluation and publication of scientific work, management of published editions. Issues in designing and implementing research projects and actions, production of supporting/explanatory material and dissemination/publication of research results.
- Communication skills (scientific writing): Types of technical texts (technical reports, scientific papers, abstracts, bachelor's/master's theses, doctoral dissertations, short reports, technical proposals). Structure of technical texts (organization into sections and subsections, key parts and content). Writing rules (writing style, length, important grammar rules, figures, graphs, and tables). Collaboration, commenting, and versioning mechanisms.
- Communication skills (oral presentation of scientific work): Purpose, types and preparation of technical presentations, determining the content and message of the technical presentation, structure and style of a successful presentation, audiovisual techniques, technical terminology. Workshop on presenting research papers.
- Innovation and entrepreneurship: Types and forms of innovation, inventions/patents, promotion of research results. Case studies of innovation in the modern research and business environment. Forms and funding of enterprises, business idea, and business plan.

TEACHING AND LEARNING METHODS – ASSESSMENT

TEACHING METHODS	Face to face and distance learning lectures
USE OF ICT	Use of presentation slides software Use of learning platform (Moodle) Communication with students through electronic means

	(email, announcement dashboards)
LEARNING ACTIVITIES	

Activity	*Semester Workload*
Lectures	39
Independent Study	30
Literature Review and Analysis	36
Project Work	120
Course Total (30 hours per credit point: 30 x 7.5 ECTS)	225

ASSESSMENT METHODS

The assessment language is Greek.

The evaluation criteria are listed in the course's webpage in the learning platform (Moodle) and are announced to the students during the first week in the classroom.

A. Semester Project (SP) (100%)

- Project 1 (20%)

Research and evaluation of bibliographic sources, writing an abstract, and a brief public presentation of scientific work.

- Project 2 (80%)

A survey paper that requires exploring and studying contemporary and reliable scientific literature. The project is assigned individually (or exceptionally in groups of two students). The deliverables include a technical text of 3200-3300 words and a public presentation of 15 minutes (individual) or 25 minutes (group).

The topics, specifications and evaluation criteria of the project are announced after the second teaching week.

SUGGESTED BIBLIOGRAPHY

- D. F. Beer, D. A. McMurrey, "A Guide to Writing as an Engineer", 4th edition, Wiley, 2014, ISBN: 978-1-118-30027-5.
- M. Alley, "The Craft of Scientific Presentations", 2nd edition, Springer, 2013, ISBN 978-1-4419-8278-0.
- N. K. Patel, "Technical Presentations", books 1,2,3 and 4, IEEE-USA E Books, 2010-2011.
- T. Moran, "Writing for Success – An Engineer's Guide", vol. 1,2,3 and 4, IEEE-USA E-books, 2011.
- H. Silyn-Roberts, "Writing for Science and Engineering", 2nd edition, Elsevier, 2012, ISBN 9780080982854.