Universitatea Naţională de Ştiinţă şi Tehnologie Politehnica Bucureşti
Facultatea de Electronică, Telecomunicaţii şi
Tehnologia Informaţiei

COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	**National University of Science and Technology Politehnica Bucharest**
1.2 Faculty	**Electronics, Telecommunications and Information Technology**
1.3 Department	**Applied Electronics and Information Engineering**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Masters
1.6 Programme of studies	Electric Vehicle Propulsion and Control

2. Date despre disciplină

2.1 Course name (ro) (en)				Metodologia cercetării Research Methodology			
2.2 Course Lecturer				S.l. Dr. Ing. Sefati Seyed Salar			
2.3 Instructor for practical activities				S.l. Dr. Ing. Sefati Seyed Salar			
2.4 Year of studies	1	2.5 Semester	I	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		F	2.9 Course code	5		2.10 Tipul de notare	Nota

3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week	2	Out of which: 3.2 course	1.00	3.3 seminary/laboratory	1
3.4 Total hours in the curricula	28.00	Out of which: 3.5 course	14	3.6 seminary/laboratory	14
Distribution of time:					hours
Study according to the manual, course support, bibliography and hand notes Supplemental documentation (library, electronic access resources, in the field, etc) Preparation for practical activities, homework, essays, portfolios, etc.					41
Tutoring					4
Examinations					2
Other activities (if any):					0

3.7 Total hours of individual study	47.00
3.8 Total hours per semester	75
3.9 Number of ECTS credit points	3

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	None
4.2 Results of learning	None

5. Necessary conditions for the optimal development of teaching activities (where applicable)

5.1 Course	A room with a projector and whiteboard
5.2 Seminary/ Laboratory/Project	A seminary room with a projector and whiteboard

6. General objective *(Reffering to the teachers' intentions for students and to what the students will be thought during the course. It offers an idea on the position of course in the scientific domain, as well as the role it has for the study programme. The course topics, the justification of including the course in the currcula of the study programme, etc. will be described in a general manner)*

The "Research Methodology" course aims to provide students with essential competencies in scientific research, preparing them to contribute actively and meaningfully to the academic and professional community. Through this course, students will learn how to approach the research process in a structured manner, from formulating a research question to writing a scientific article, a review, or a project proposal. These practical activities are fundamental to the development of critical and analytical thinking, necessary for both academic and industrial careers. The course is included in the curriculum to provide students with a solid foundation for conducting scientific research, helping them become professionals capable of developing innovative projects and publishing impactful works in their field of expertise.

7. Competences *(Proven capacity to use knowledge, aptitudes and personal, social and/or methodological abilities in work or study situations and for personal and proffesional growth. They refflect the empolyers requirements.)*

Specific Competences	Students enrolled in the "Research Methodology" course will develop specific competencies related to writing and publishing a scientific article, drafting a review article, and preparing a project proposal. They will learn how to apply advanced research techniques, select appropriate investigative methods, and critically and efficiently integrate the literature into their work. Furthermore, they will acquire essential skills in managing bibliographic resources and using citations correctly, contributing to the development of relevant and rigorous articles. These activities will enable students to conduct independent research, analyze complex data, and propose innovative solutions in their area of expertise.
Transversal (General) Competences	The course also contributes to the development of essential transversal competencies, such as critical thinking, the ability to solve complex problems, and effective communication, both written and oral. Students will learn to work efficiently in multidisciplinary teams, coordinate their efforts with their peers, and express their ideas clearly and convincingly. Additionally, the course emphasizes the importance of academic integrity and research ethics, fostering a responsible and professional attitude when addressing challenges in academic and professional environments. The ability to think independently and adapt work methods to the requirements of various projects will prepare students to meet employers' expectations and successfully integrate into the professional environment.

8. Learning outcomes *(Synthetic descriptions for what a student will be capable of doing or showing at the completion of a course. The learning outcomes reflect the student's acomplishments and to a lesser extent the teachers' intentions. The learning outcomes inform the students of what is expected from them with respect to performance and to obtain the desired grades and ECTS points. They are defined in concise terms, using verbs similar to the examples below and indicate what will be required for evaluation. The learning outcomes will be formulated so that the correlation with the competences defined in section 7 is highlighted.)*

Knowledge	*The result of knowledge aquisition through learning. The knowledge represents the totality of facts, priciples, theories and practices for a given work or study field. They can be theoretical and/or factual.* At the end of the "Research Methodology" course, students will possess solid knowledge of the fundamental principles and practices of scientific research. They will learn how to formulate a research question correctly, how to identify and apply appropriate methods for data collection and analysis, and how to use specialized literature to support a scientific study. Students will gain a deep understanding of the structure of a scientific article, a review, as well as the process of preparing a project proposal, allowing them to contribute with relevant papers in their fields of research.
Skills	*The capacity to apply the knowledge and use the know-how for completing tasks and solving problems. The skills are described as being cognitive (requiring the use of logical, intuitive and creative thinking) or practical (implying manual dexterity and the use of methods, materials, tools and intrumentation).* Students will develop the ability to apply the theoretical knowledge acquired to effectively carry out research tasks. They will be able to structure and write scientific articles correctly, learn to use digital tools for managing citations and references, and be capable of drafting and defending a project proposal. Moreover, they will acquire skills in critically evaluating the literature, formulating conclusions, and interpreting collected data, demonstrating the cognitive and practical abilities required in any advanced research process.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* At the end of the course, students will be able to autonomously and responsibly manage their research activities, demonstrating professional and academic ethics in performing tasks. They will be able to make informed, evidence-based decisions, know how to manage individual or team projects, and be capable of presenting and defending their research results both in writing and orally. Additionally, students will be encouraged to take initiative and develop their ability to work independently while respecting academic and professional rigor.

9. Teaching techniques *(Student centric techniques will be considered. The means for students to participate in defining their own study path, the identification of eventual fallbacks and the remedial measures that will be adopted in those cases will be described.)*

The "Research Methodology" course will employ student-centered teaching methods to facilitate an active and participatory learning process. Teaching will include interactive lectures, discussions, debates, case studies, and project-based learning. Students will be encouraged to actively participate in shaping their learning path by choosing their research topics and the type of project they wish to develop. Regular feedback sessions will be organized, both from the instructor and peers, to identify any difficulties encountered by students. In cases where students fall behind, supplementary tutoring sessions, laboratory work adapted to individual needs, and practical exercises will be organized to consolidate knowledge and skills.

10. Contents

COURSE		
Chapter	**Content**	**No. hours**

1	Introduction to Research Methodology General overview of research methodology Types of research (qualitative vs. quantitative) Defining a research question and hypothesis	2
2	tructure of a Scientific Article Understanding the structure (Abstract, Introduction, Methods, Results, Discussion, Conclusion) Writing a clear and concise abstract The importance of properly formulating a research question	2
3	Literature Review and Citation Management How to conduct a literature review Tools for managing references (Zotero, Mendeley, EndNote) Citation styles (APA, IEEE, etc.)	2
4	Research methods: experimental, survey, case study, etc. Sampling techniques, data collection methods Planning the research workflow	2
5	Writing a Review Article What a review article is and how it differs from a research article Strategies for synthesizing the literature Critical evaluation of sources	2
6	Writing a Research Proposal or Project Structure of a research proposal (problem statement, objectives, methodology, timeline) Budget planning and feasibility Tips for presenting and defending a proposal	2
7	Presenting Research Findings Best practices for presenting research at conferences How to create an effective PowerPoint presentation or poster Oral presentation skills	2
	Total:	14

Bibliography:

Razvan Craciunescu - course notes - moodle
Writing a scientific article: A step-by-step guide for beginners, F. Ecarnot *, M.-F. Seronde, R. Chopard, F. Schiele, N. Meneveau
Pierson DJ. The top 10 reasons why manuscripts are not accepted for publication. Respir Care 2004;49:1246–52.
Guyatt GH, Brian Haynes R. Preparing reports for publication and responding to reviewers' comments. J Clin Epidemiol 2006;59:900–6.
Keen A. Writing for publication: pressures, barriers and support strategies. Nurse Educ Today 2007;27:382–8. Powell K. Publish like a pro. Nature 2010;467:873–5.
Driscoll J, Aquilina R. Writing for publication: a pratical six-step approach. Int J Orthop Trauma Nurs 2011;15:41–8.
El-Serag HB. Writing and publishing scientific papers. Gastroenterology 2012;142:197–200.
Writing for books and journals; https://www.publishingcampus.elsevier.com/ pages/14/Colleges/College-of-Skill-training/Writing-for-books-and-journals.html.

SEMINARY

Crt. no.	Content	No. hours
1	Selecting a Research Topic and Formulating a Research Question Practical activity: brainstorming and narrowing down research topics. Developing a clear and concise research question.	2
2	Structuring a Scientific Article Practical work: drafting an introduction and literature review sections. Peer-review sessions for feedback.	2
3	Using Citation Management Tools Practical introduction to tools such as Zotero or Mendeley. Creating a bibliography and managing references.	2
4	Designing the Research Methodology Students design the methodology for their chosen research topic. Discussion on the strengths and weaknesses of various research methods.	2
5	Writing a Review Article Practical session: Students work on drafting a review article on a chosen topic. Peer-review for providing feedback to colleagues.	2
6	Writing a Research Proposal Students prepare a short research proposal, including objectives, methodology, and timeline. Presenting the proposal for feedback.	2
7	Presenting Research Results Practical activity: Preparing a PowerPoint presentation or poster based on a hypothetical study. Practicing delivering an oral presentation to the group.	2

	Total:	14

Bibliography:

Razvan Craciunescu - seminaries notes - moodle
Writing a scientific article: A step-by-step guide for beginners, F. Ecarnot *, M.-F. Seronde, R. Chopard, F. Schiele, N. Meneveau
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El-Serag HB. Writing and publishing scientific papers. Gastroenterology 2012;142:197–200.
Writing for books and journals; https://www.publishingcampus.elsevier.com/ pages/14/Colleges/College-of-Skill-training/Writing-for-books-and-journals.html.

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	Multiple-choice questions	Written exam	50%
11.5 Seminary/laboratory/project	Assignments during the seminar	Oral presentations	50%
11.6 Passing conditions			
• Achieving 50% of the total score • Completing the laboratory obligations (participation in planned sessions)			

12. Corroborate the content of the course with the expectations of representatives of employers and representative professional associations in the field of the program, as well as with the current state of knowledge in the scientific field approached and practices in higher education institutions in the European Higher Education Area (EHEA)

The content of the "Research Methodology" course is aligned with the requirements and expectations of employers and professional associations in the fields of research and innovation. Employers are seeking graduates who can prepare and publish high-quality scientific papers, draft competitive research project proposals, and contribute to advancing knowledge in their areas of expertise. The course also integrates the latest trends and research in the scientific field, offering students access to modern research methods, digital tools for literature management, and the most up-to-date techniques for critical source evaluation.

The course is designed in accordance with educational practices from higher education institutions in the European Higher Education Area (EHEA), promoting international standards of excellence in education and research. Thus, students benefit from relevant and updated academic preparation, which includes innovative project-based learning methods, interdisciplinary collaboration, and the development of skills necessary to meet the challenges of the international professional environment. This alignment ensures that graduates of the course are prepared not only for the current needs of the job market but also for future innovations in the fields of research and education.

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Date	Course lecturer	Instructor(s) for practical activities
21.09.2025	S.l. Dr. Ing. Sefati Seyed Salar	S.l. Dr. Ing. Sefati Seyed Salar

Date of department approval	Head of department Conf. Dr. Ing. Bogdan Florea
Date of approval in the Faculty Council	Dean Prof. Dr. Ing. Mihnea Udrea