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	**Electronic Devices, Circuits and Architectures**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Masters
1.6 Programme of studies	Advanced Microelectronics

2. Date despre disciplină

2.1 Course name (ro) (en)				Modul de cercetare ştiinţifică I Module of scientific research I			
2.2 Course Lecturer				Prof. dr. ing. Alexandru Vasile			
2.3 Instructor for practical activities				Prof. Dr. Alexandru VASILE			
2.4 Year of studies	1	2.5 Semester	1	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		S	2.9 Course code	8		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	12	Out of which: 3.2 course	0.00	3.3 seminary/laboratory	12
3.4 Total hours in the curricula	168	Out of which: 3.5 course	0	3.6 seminary/laboratory	168
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.					244
Tutoring					0
Examinations					6
Other activities (if any):					0

3.7 Total hours of individual study	82.00
3.8 Total hours per semester	250
3.9 Number of ECTS credit points	10

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	NA

4.2 Results of learning	Acquiring necessary knowledge by documentation on current status od specific domain of the selected dissertation thesis.

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

5.1 Course	NA
5.2 Seminary/ Laboratory/Project	NA

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)*

Bibliographical research on both theory and practice in the field of the dissertation thesis.

Generating a Research Report on the dissertation thesis topic.

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	- Application of fundamental and specialized knowledge to solve complex technical problems, specific to the field of Microelectronics; - Development of engineering solutions to solve problems in the field of Microelectronics and electronics for cars; - Solving problems related to the control of fast processes and the use of numerical controllers; - Implementation and use of hardware and software in microelectronic applications that contain power devices; - Designing sensor interfaces information processing devices computer science elements;
Transversal (General) Competences	- The fulfillment of professional tasks with the exact identification of the objectives to be achieved, any potential risk factors, the available resources, the economic-financial aspects, the conditions for their completion, the working stages, the working time and the related deadlines; - Responsible execution of work tasks in a multidisciplinary team, assuming roles on different hierarchical levels; - Identifying the need for continuous training and the effective use of information sources and communication resources and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a foreign language international circulation.

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.* Lists the most important stages that marked the development of the field of the chosen dissertation topic Defines domain-specific notions. Describes/classifies notions/processes/phenomena/structures. Collect the information obtained as a result of the documentation
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).* Selects and synthesizes information relevant to the proposed dissertation topic. Develops a Research Report technical-scientific bibliography, having as subject the field of the dissertation project theme. Formulates the conclusions of the Report. Analyzes its own solutions for the proposed topic. Proposes a hardware block diagram and/or a software flow chart for the specific objective of the chosen alternative. Arguments the identified solutions/solutions of the dissertation topic.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Selects suitable bibliographic sources and analyzes them. Respects the principles of academic ethics, correctly citing the bibliographic sources used. Demonstrates responsiveness for new learning contexts. Shows collaboration with other colleagues and teaching staff in carrying out teaching activities. Demonstrates autonomy in the organization of the learning situation/context or the problem situation to be solved. Applies principles of professional ethics/deontology in the analysis of the technological impact of the proposed solutions in the specialized field of the environment.

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.)*

NA

10. Contents

Bibliography:

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	NA	NA	0

11.5 Seminary/laboratory/project	Active participation during the semester in research activities	Grading during the semester of the master's student's active participation in research activities.	20
	The content, complexity, originality, technical solutions used, innovation, practical results of the research activity.	Grading of the research report based on the submitted activities and the oral presentation.	80
11.6 Passing conditions			
In accordance with: Regulation on the organization and operation of the process of education within the university master's studies in the Politechnica Bucharest, from its website; ETTI Regulation regarding the preparation of graduation theses, from the ETTI website.			

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)

By the activities carried out, the students develop skills to offer solutions to problems and to propose ideas to improve the situation of existence in the field of Microelectronics, from different perspectives included in the study program of the EIA master (auto, RF, devices, power electronics, digital, etc.)

The project carries out activities with similar content to those carried out in European institutions of higher education such as: University of Applied Sciences - Vienna, Austria; Technical University of Ostrava – Czech Republic; Liverpool Hope University – England; Bremen University of Applied Science – Germany; Fontyţs University of Applied Sciences – Eindhoven Campus, Netherlands; Helsinki Metropolia University of Applied Sciences – Finland, Wroclaw University of Technology – Poland, etc

Through the multiple and diversified activities carried out during the project, the aim is to develop the graduate's skills to manage practical situations that he may face in real life in order to increase his contribution to the improvement of the socio-economic environment.

Date	Course lecturer	Instructor(s) for practical activities
21.09.2026	Prof. dr. ing. Alexandru Vasile	Prof. Dr. Alexandru VASILE

Date of department approval	Head of department

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22.09.2026

Prof. Dr. Claudius Dan

Date of approval in the Faculty Council

Dean

22.09.2026

Prof. Dr. Mihnea Udrea