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)				Activitate de cercetare și practică 3 Research Activity and Practical Work 3			
2.2 Course Lecturer				NA			
2.3 Instructor for practical activities				Prof. dr. ing. Claudius Dan			
2.4 Year of studies	2	2.5 Semester	I	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		DA	2.9 Course code	UPB.04.M3.O.04-93		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	0	Out of which: 3.2 course	0.00	3.3 seminary/laboratory	0
3.4 Total hours in the curricula	0.00	Out of which: 3.5 course	0	3.6 seminary/laboratory	0
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.					235
Tutoring					10
Examinations					5
Other activities (if any):					0

3.7 Total hours of individual study	250.00
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 of the necessary knowledge following the research and integration of the hardware and/or software blocks of the proposed scheme within the CSP S2 discipline from the previous semester (being its continuation) on the specific individualized theme of each dissertation project.

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)*

Specifying the theme of the dissertation work, choosing the bibliography, establishing the content of the work, planning the time budget.

Carrying out the activities of documentation and theoretical and practical research, design, implementation, experimentation and practical testing, the elaboration of the manuscript, the graphic material, the experimental results, the conclusions and the preparation of the bibliography.

Elaboration of presentation materials (PowerPoint type, practical demonstrations) and preparation of the oral defense of the dissertation.

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	- Applying fundamental and specialized knowledge to solve complex, specific technical problems in the Microelectronics field; - Development of engineering solutions to solve some problems in the field of power electronics and car electronics; - Implementation and use of hardware and software in microelectronics applications; - Designing some circuits for conditioning the signals of some sensors and transmitting the information
Transversal (General) Competences	Creating the skills to apply fundamental and specialized knowledge in order to solve complex technical problems in electronics and applied informatics systems. Fulfilling professional tasks, using the precise identification of objectives, available resources and respecting deadlines.

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 component blocks in the hardware block diagram and the software flowchart and integrate them to work together systemically. Checks the correct hardware operation of the entire system proposed in the project theme. Verifies the correct software operation of the entire system proposed by the project theme. Writes the operation of the system as a fully functional unitary whole. Edits the technical and scientific part through text, mathematical relationships, explanatory graphics, etc.
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).* Prepares an integrative research report. Checks out experimentally the hardware and/or software operation of the entire system proposed by the project theme. Optimizes the operation of the described system. Arguments on scientific grounds the selected optimized solution. Formulates appropriate conclusions.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Respects the principles of academic ethics, correctly citing the bibliographic sources used. Demonstrates responsiveness for new solutions. Shows collaboration with other colleagues and teaching staff in carrying out research activities. Demonstrates autonomy in organizing the learning situation/context or the unsolved problem situation. Realizes the value of his contribution to the field of engineering to the identification of viable/sustainable solutions to solve problems in social and economic life (social responsibility). Applies principles of professional ethics/deontology in the analysis of the technological impact of the proposed solutions in the specialized field of the environment. Analyzes and capitalizes on business opportunities of entrepreneurial development in the specialty field. Demonstrates real-life situation management skills (collaborative vs. conflict time management).

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 student's active participation in research activities.	20
	The content, the complexity, the originality, the technical solutions used, the innovation, the practical results of the research activity.	Notarea raportului de cercetare pe baza activităţii depuse şi a susţinerii orale.	80
11.6 Passing conditions			
In compliance with: Regulation on the organization and operation of the process of education in the framework of university studies with a master's degree in Politechnica Bucharest, from the 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)

Through the activities carried out, students develop skills to offer solutions to problems and to propose ideas for improving the situation of existence in the field of Microelectronics, from different industrial branches included in the master's study program (automotive, devices, power electronics, RF, 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 abilities 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
Sep. 20, 2024	NA	Prof. dr. ing. Claudius Dan

Date of department approval	Head of department
31.10.2024	Prof. Dr. Claudius DAN

Universitatea Națională de Știință și Tehnologie Politehnica București

Facultatea de Electronică, Telecomunicații și

Tehnologia Informației

Date of approval in the Faculty Council	Dean
01.11.2024	Prof. Dr. Mihnea Udrea