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	Bachelor/Undergraduate
1.6 Programme of studies	Microelectronics, Optoelectronics and Nanotechnologies

2. Date despre disciplină

2.1 Course name (ro) (en)				Dezvoltarea aplicaţiilor şi serviciilor software inovatoare Developing innovative software applications and services			
2.2 Course Lecturer				Conf. Dr. Eduard-Cristian Popovici			
2.3 Instructor for practical activities				Conf. Dr. Eduard-Cristian Popovici			
2.4 Year of studies	3	2.5 Semester	1	2.6. Evaluation type	V	2.7 Course regime	F
2.8 Course type		S	2.9 Course code	04.S.05.L.026		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	3	Out of which: 3.2 course	1	3.3 seminary/laboratory	2
3.4 Total hours in the curricula	42	Out of which: 3.5 course	14	3.6 seminary/laboratory	28
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.					26
Tutoring					14
Examinations					4
Other activities (if any):					0

3.7 Total hours of individual study	33.00
3.8 Total hours per semester	75
3.9 Number of ECTS credit points	3

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	Computer Programming Data Structures and Algorithms Object-Oriented Programming

4.2 Results of learning	General programming knowledge, working with simple and complex data structures, writing object-oriented programs

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

5.1 Course	The course will take place in a room equipped with a video projector and a computer.
5.2 Seminary/ Laboratory/Project	The laboratory will take place in a room with specific equipment, which must include a video projector and a computer.

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 course aims to develop the ability to apply general knowledge regarding the development of applications on the Android platform within several categories of projects

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	Demonstrates basic knowledge in the field of programming Correlates knowledge Demonstrates basic/advanced knowledge in the field of developing software applications specific to mobile operating systems. Applies standardized methods and tools specific to software development for the evaluation and diagnosis of a situation, depending on the identified/reported problems, and identifies solutions. Argues and analyzes coherently and correctly the context of applying the basic knowledge of software application development, using key concepts from software development and the specific methodology.
Transversal (General) Competences	Works in a team and communicates effectively, coordinating efforts with others to solve medium-complexity problem situations. Autonomy and critical thinking: the ability to think in scientific terms, to search for and analyze data independently, as well as to draw and present conclusions / identify solutions. Respects the principles of academic ethics: correctly cites the bibliographic sources used in documentation.

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 applications and mobile operating systems. Defines concepts specific to software development, with a focus on mobile applications Describes/classifies processes in software development Highlights consequences and relationships.
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).* Works productively in a team. Experimentally verifies identified solutions. Solves practical applications. Identifies solutions and develops resolution plans/projects. Formulates conclusions for the experiments carried out. Argues the identified solutions/methods of solving.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Selects appropriate bibliographic sources and analyzes them. Respects the principles of academic ethics, correctly citing the bibliographic sources used. Demonstrates receptiveness to new learning contexts. Shows collaboration with colleagues and teaching staff in carrying out teaching activities Demonstrates autonomy in organizing the learning context or the problem to be solved Shows social responsibility through active involvement in student social life / involvement in events within the academic community • Promotes/contributes with new solutions, related to the field of specialization, to improve the quality of social life. • Is aware of the value of their contribution in the field of engineering to identifying viable/sustainable solutions to solve problems in social and economic life (social responsibility). • Applies principles of professional ethics/deontology in analyzing the technological impact of the proposed solutions in the field of specialization on the environment. • Analyzes and capitalizes on business/entrepreneurial development opportunities in the development of mobile applications.

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.)*

Starting from the analysis of students' learning characteristics and their specific needs, the teaching process will explore both expository methods (lecture, presentation) and conversational-interactive methods, based on discovery learning models facilitated by direct and indirect exploration of reality (experiment, demonstration, modeling), as well as action-based methods such as exercises, practical activities, and problem-solving.

In teaching activities, lectures will be used, based on PowerPoint presentations or various short videos that will be made available to students. The presentations use images and diagrams so that the information presented is easy to understand and assimilate.

This course covers information and practical activities meant to support students in their learning efforts and in developing optimal relationships of collaboration and communication in a climate favorable to discovery learning.

Attention will be paid to practicing active listening and assertive communication skills, as well as feedback construction mechanisms, as ways of behavioral regulation in diverse situations and of adapting the pedagogical approach to students' learning needs. Teamwork skills will be practiced to solve different learning tasks.

10. Contents

COURSE		
Chapter	**Content**	**No. hours**
1	Introduction to software applications for mobile devices	4
2	The Android platform	6
3	Programming interactive graphical interfaces on the Android platform	8
4	Thematic software applications	10
	Total:	28

Bibliography:
1) Popovici Eduard-Cristian, suport de curs electronic https://electronica.curs.upb.ro
2) Tatiana Radulescu, "Ingineria software orientata pe obiecte", Matrix Rom, Bucureşti, 2000
3) Android Developer https://developer.android.com/

LABORATORY		
Crt. no.	**Content**	**No. hours**
1	First Android application	2
2	Designing the user interface of an application	4
3	Implementing the user interface of an application	4
4	Data persistence	2
5	Laboratory colloquium	2
	Total:	14
PROJECT		
Crt. no.	**Content**	**No. hours**
1	Choosing the topic	2
2	Design and implementation of the graphical interface	6
3	Presentation of the first stage results	2
4	Implementation of other elements of the application	2
5	Final presentation of the project	2
	Total:	

Bibliography:
1) Popovici Eduard-Cristian, suport de curs electronic https://electronica.curs.upb.ro
2) Code labs for Android Developer https://codelabs.developers.google.com/s/results?q=android

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	- knowledge of fundamental theoretical concepts - knowledge of how to apply theory to specific problems	- questions regarding the concepts used in the project	50%
11.5 Seminary/laboratory/project	- degree of fulfillment of the software project requirements - the way the software project is presented	- code evaluation - presentation evaluation	50%
11.6 Passing conditions			
Obtaining 50% of the total score. Obtaining 50% of the score for the activity throughout the semester.			

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 the ability to offer solutions to problems and propose ideas to improve existing situations in the field of programming

• In developing the course content, knowledge/aspects/processes described by the specialized literature were considered

Date	Course lecturer	Instructor(s) for practical activities
21.09.2026	Conf. Dr. Eduard-Cristian Popovici	Conf. Dr. Eduard-Cristian Popovici

Date of department approval	Head of department
22.09.2026	Prof. Dr. Claudius Dan

Date of approval in the Faculty Council	Dean

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22.09.2026 Prof. Dr. Mihnea Udrea

