Universitatea Națională de Știință și Tehnologie Politehnica București
Facultatea de Electronică, Telecomunicații și
Tehnologia Informației

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	**Telecommunications**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Masters
1.6 Programme of studies	Advanced Wireless Communications

2. Date despre disciplină

2.1 Course name (ro) (en)				Activitate de cercetare și practică 2 Research Activity and Practical Work 2			
2.2 Course Lecturer				Prof. PhD Vlădeanu Călin			
2.3 Instructor for practical activities				Prof. PhD Vlădeanu Călin			
2.4 Year of studies	1	2.5 Semester	II	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		DA	2.9 Course code	UPB.04.M2.O.21-92		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.					245
Tutoring					4
Examinations					1
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	it is not the case
4.2 Results of learning	it is not the case

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

5.1 Course	it is not the case
5.2 Seminary/ Laboratory/Project	The research will be carried out in a room with specific equipment, which must include: projection screen, multimedia projector, whiteboard, computers with Internet connection and IP UPB addresses.

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)*

It is desired to identify a communication subsystem for wireless networks (software/hardware/combined) to be analyzed in detail using the usual performance analysis methods. Students must experimentally test (by simulation or with physical equipment) the wireless communication subsystem using test/analysis algorithms presented in research papers in the specialized literature.

Students must compare the results obtained with those reported by other well-known researchers, interpret and argue these results.

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	It argues and analyzes coherently and correctly the context of application of the basic knowledge of the field, using key concepts of the discipline and the specific methodology. Oral and written communication in Romanian: uses the scientific vocabulary specific to the field, in order to communicate effectively, in writing and orally. Oral and written communication in a foreign language (English): demonstrates understanding of subject-related vocabulary in a foreign language.
Transversal (General) Competences	Ability to communicate with higher hierarchical structures and subordinate team. The ability to function as a leader of a team that may consist of people with different specializations and skill levels. The ability to identify and apply the most suitable and relevant management strategies of the subordinate team. The ability to make decisions in order to solve current or unpredictable problems that appear in the process of operating computer systems. The ability to ensure the planning and management of information engineering projects. The ability to constantly inform and document for personal and professional development by reading specialized literature. The ability to communicate and present technical content in both Romanian and English. Respect the principles of academic ethics: in the documentation activity, correctly cite the bibliographic sources used. Put into practice elements of emotional intelligence in the appropriate social-emotional management of real-life/academic/professional situations, demonstrating self-control and objectivity in decision-making or stressful situations.

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.* It lists the most important stages that marked the development of the field. Defines domain-specific notions. Describes/classifies notions/processes/phenomena/structures. It 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).* Select and group relevant information in a given context. Uses specific principles with reason. Work productively in a team. Elaborate a scientific text. Experimentally verify identified solutions. Solve practical applications. Interpret causal relationships appropriately. Analyze and compare various ideas and concepts. Identifies solutions and develops resolution/project plans. Formulate conclusions to the experiments carried out. Argue the identified solutions/workarounds.
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Select appropriate bibliographic sources and analyze them. Respect the principles of academic ethics, correctly citing the bibliographic sources used. Demonstrates responsiveness to new learning contexts. Demonstrates collaboration with other colleagues and teaching staff in carrying out teaching activities. Demonstrates autonomy in organizing the learning situation/context or the problem situation to be solved. Demonstrates social responsibility through active involvement in student social life/involvement in academic community events. Promotes/contributes through new solutions related to the specialized field to improve the quality of social life. He realizes the value of his contribution in the field of engineering to the identification of viable/sustainable solutions to solve problems in social and economic life (social responsibility). Apply principles of professional ethics/deontology in the analysis of the technological impact of the proposed solutions in the specialized field on the environment. Analyzes and capitalizes on business/entrepreneurial development opportunities in the specialty area. 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.)*

During the project, students will benefit from access to the institution's research infrastructure. Also, they will have access to a series of international indexed engines, such as: Thomson Reuters Science, ScienceDirect, Springer Link as well as to a series of scientific publications in the field: IEEE Wireless Communications Letters, IEEE Wireless Communications, IEEE Transactions on Wireless Communications, Journal of Communications and Networks, IEEE Communications Magazine, IEEE Transactions on Communications, IEEE Journal on Selected Areas in Communications, IEEE Signal Processing Magazine. Throughout the duration of the project, the students will be supported and will benefit from the field expertise of the project supervisor. Teamwork skills will be practiced to solve different learning tasks.

10. Contents

Bibliography:

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course			
11.5 Seminary/laboratory/project	The project will include in a written material: - description of the idea; - comparison with existing technologies; - description of functionality; - [description of the hardware/software component, if applicable] - [function demonstrator, optional] - market study framework (user market, commercial exploitation scheme, etc.)	The marking of this activity is under verification. For grading, the method of creating the synthesis report related to the research topic addressed and the ability to understand, synthesize and express the specific notions of wireless communication systems and networks will be appreciated. The way in which the student is able to answer questions related to the content of the paper will also be evaluated.	100%
11.6 Passing conditions			
Description of analysis/testing solution and functionalities - grade 5; additional incremental scoring proportional to the amount and complexity of the bibliography reviewed and integrated.			

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 field of wireless communications has become a mature market with a fast growth rate. The transition of consumers to wireless networks and communication systems is complete, with the industry closely following this trend. The industry has an important demand for qualified engineers with specializations related to wireless communications and a solid foundation in electronics, telecommunications networks and systems, and information technology, so that the pace of development of new hardware products and software applications can be maintained.

The course curriculum responds concretely to these current development and evolution requirements, subscribed to the European economy of services in the field of Electronic Engineering, Telecommunications and Information Technology (EETIT). In the context of the current technological progress of electronic devices, the targeted fields of activity are practically unlimited, from "consumer" applications ("smart-phone" type mobile terminals, laptops, other wireless devices), the medical field (wireless communication products and technologies for diagnosis and monitoring of patients), the military field (ad hoc network products and technologies, jamming and anti-jamming systems, drone control, target location, etc.), the security field (wireless surveillance systems), the industrial automation field (systems locating, inspecting and transporting products), robotics (man-machine communication systems and remote robot coordination)and others.

In this way, the graduates are provided with adequate skills with the needs of the current qualifications and a modern, quality and competitive scientific and technical training, which will allow them to be employed quickly after graduation, being perfectly framed in the policy of the National Polytechnic University of Science and Technology from Bucharest, both from the point of view of from the point of view of content and structure, as well as from the point of view of the skills and international openness offered to students.

Date	Course lecturer	Instructor(s) for practical activities
	Prof. dr. ing. Călin VLĂDEANU	Prof. dr. ing. Călin VLĂDEANU

Date of department approval	Head of department
27.10.2024	Conf. Dr. Serban Georgica Obreja

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Date of approval in the Faculty Council	Dean
25.10.2024	Prof. Dr. Mihnea Udrea