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 1 Research Activity and Practical Work 1			
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	I	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		DA	2.9 Course code	UPB.04.M1.O.21-91		2.10 Tipul de notare	A/R

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	Completion of the following disciplines: Data Communications, Mobile Communication Networks, Communication Architectures and Protocols, Networks and Services.

4.2 Results of learning	Accumulation of the following knowledge regarding: theory of signal transmission and processing, telecommunications systems, architecture, protocols and services of mobile networks, planning and simulation of telecommunications networks and designing telecommunications subsystems for data, voice and multimedia applications.

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, blackboard, computers with Internet connection and IP addresses from UPB.

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 objective of the discipline is to familiarize students with both scientific and technical information activities, as well as solving fundamental scientific research problems related to the dissertation in the fields of: software applications for mobile terminals, advanced services and protocols for telecommunications networks, advanced digital signal processing techniques for audio, video and multimedia, digital radio audio technologies, wireless communications - architecture and security, advanced data transmission technologies, cryptographic algorithms for wireless communications, software defined radio systems and the design of programmable circuits, satellite communications, security protocols for wireless communications.

Discussion of research results. Establishing the objectives of the next stage, in the context of the thesis theme.

Supervision of the organization of the presentation of the results in the form of a scientific article and a PowerPoint presentation.

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	Motivate and analyze coherently and correctly the context of knowledge application basis of the field, using key concepts of the discipline and specific methodology. Oral and written communication in Romanian: uses specific scientific vocabulary field, in order to communicate effectively, in writing and orally. Oral and written communication in a foreign language (English): demonstrate understanding the vocabulary related to the field, 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. Interpret causal relationships appropriately. It uses specific principles with reason. Work productively in a team. Identifies solutions and develops resolution/project plans. Solve practical applications. Experimentally verify identified solutions. Formulate conclusions to the experiments carried out. Argue the identified solutions/workarounds. Elaborate a scientific text.

Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Demonstrates responsiveness to new learning contexts. Demonstrates autonomy in organizing the learning situation/context or unsolved problem situation. Select appropriate bibliographic sources and analyze them. Respect the principles of academic ethics, correctly citing the bibliographic sources used. Apply ethics/professional ontology principles in the analysis of the technological impact of the solutions proposed in the specialized field on the environment. Demonstrates collaboration with other colleagues and teaching staff in carrying out teaching activities. Demonstrates real-life situation management skills (collaborative vs. conflict time management). He/she realizes the value of his/her contribution in the field of engineering to the identification of viable/sustainable solutions to solve problems in social and economic life (social responsibility). Promotes/contributes through new solutions related to the specialized field to improve the quality of social life. Demonstrates social responsibility through active involvement in student social life/involvement in academic community events. Analyzes and capitalizes on business/entrepreneurial development opportunities in the field of specialty.

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 teacher regularly interacts with the students for framing and tracking the way of scientific information, the way of acquiring knowledge, the way of designing and drafting the documentation. Students have access both to bibliographic resources and to related research laboratories throughout the duration of their research activities.

10. Contents

Bibliography: IEEE Documentation database, http://ieeexplore.ieee.org

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	- how to prepare the bibliography regarding the studied subject; - knowledge of fundamental theoretical and practical notions regarding sources of information in the field; - evaluation of the way of realization of the scientific research report both from the point of view of the structure and the information provided; - the ability to answer specific questions related to the studied research topic.	- evaluation of the scientific report, delivered in written form, including a review of the available scientific bibliography and the main current achievements in the field on a fixed theme; - the oral assessment of the students' knowledge regarding the field and subject addressed in the report.	100%
11.6 Passing conditions			
- creating a bibliographic list on a topic imposed by the field; - selection of relevant bibliographic sources by comparing references; - presentation (argued) of a number of significant achievements and results in the field; - making a properly structured scientific report.			

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
09.09.2022	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

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