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

2. Date despre disciplină

2.1 Course name (ro) (en)				Comunicaţii multimedia. Compresia audio şi video			
2.2 Course Lecturer				Prof. Dr. Dragos Nicolae Vizireanu			
2.3 Instructor for practical activities				Prof. Dr. Dragos Nicolae Vizireanu			
2.4 Year of studies	1	2.5 Semester	II	2.6. Evaluation type	E	2.7 Course regime	Ob
2.8 Course type		S	2.9 Course code	4		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	3.5	Out of which: 3.2 course	1.50	3.3 seminary/laboratory	2
3.4 Total hours in the curricula	49.00	Out of which: 3.5 course	21	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.					33
Tutoring					0
Examinations					0
Other activities (if any):					0

3.7 Total hours of individual study	51.00
3.8 Total hours per semester	100
3.9 Number of ECTS credit points	4

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	All the necessary elements are introduced.
4.2 Results of learning	All the necessary elements are introduced.

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.
5.2 Seminary/ Laboratory/Project	The Laboratory will take place in a room equipped with computers.

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)*

- for the course: The present discipline aims to present the main audio/video compression and coding techniques in a unified manner. In this context, the most used compression methods of still images, video sequences and audio signals are reviewed. The presented compression techniques are later aggregated in complex audio/video applications, both in the field of multimedia content storage or distribution and in the communications category.
- for applications: Testing the performance of different compression standards and highlighting the areas of application for the main current solutions regarding high-performance compression of audio/video signals.

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	Highlighting the performances and application areas for the main current solutions regarding audio and video compression. Software applications will be made on general and/or dedicated hardware. Demonstrates basic/advanced knowledge of multimedia communications. Correlate knowledge. Apply knowledge in practice. It applies standardized methods and tools, specific to the field, to carry out the evaluation and diagnosis process of a situation, depending on the identified/reported problems, and identifies solutions. 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.
Transversal (General) Competences	Works in a team and communicates effectively, coordinating efforts with others to solve problem situations of medium complexity. Autonomy and critical thinking: the ability to think in scientific terms, search and analyze data independently, and draw and present conclusions / identify solutions. Ability to analyze and synthesize: presents the acquired knowledge in a synthetic way, as a result of a process of systematic analysis. Respect the principles of academic ethics: correctly cite the bibliographic sources used in the documentation activity. It applies elements of emotional intelligence in the appropriate social-emotional management of real-life 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. It 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. 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. Realizes the value of its 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 solutions proposed 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.)*

The presentation of the course lectures is done in the amphitheater with multimedia facilities. The course syllabus presented to the students is fully covered by written material published by the course holders. Lab platform sheets are available to students in electronic form. In the teaching activity, lectures will be used, based on some Power Point presentations that will be made available to the students. Presentations use images and diagrams so that the information presented is easy to understand and assimilate. This discipline covers information and practical activities designed to support students in their learning efforts and the development of optimal collaborative and communicative relationships in a climate conducive to discovery learning. It will be considered the practice of active listening and assertive communication skills, as well as feedback construction mechanisms, as ways of regulating behavior in various situations and adapting the pedagogical approach to the students' learning needs. Teamwork skills will be practiced to solve different learning tasks.

10. Contents

COURSE

Chapter	Content	No. hours
1	Audio compression. 3.1. MPEG1 Audio. 3.2. MPEG2 Audio. 3.3. Dolby AC3, ATRAC, DTS 3.4. Audio objects. MPEG4 – Audio	4
2	Still image compression. 4.1. Image types. 4.2. Color representation. 4.3. JPEG and JPEG2000 compression standards. 4.4. Image storage formats.	6
3	Video compression 5.1. Video signals - principles. 5.2. Motion estimation/compensation. 5.3. Video compression for multimedia applications H261, H263, H264. 5.4. Video compression for storage/distribution – MPEG1-Video, MPEG2-Video, MPEG4-Video.	4
4	Systems and applications. 6.1. MPEG1 systems. MPEG2 systems. 6.2 MPEG2 applications. DVD-Video. DVB. 6.3. Videoconferencing and videophone applications	4
	Total:	
Bibliography:		

LABORATORY		
Crt. no.	**Content**	**No. hours**
1	Laboratory assessment.	2
	Total:	14
Bibliography:		

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	Final examination	Final examination	40%
11.5 Seminary/laboratory/project	Final examination	Final examination	60%
11.6 Passing conditions			
To obtain 50% of points (100).			

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 some problems and to propose ideas to improve the situation of existence in the field of Telecommunications. In the development of the content of the discipline, knowledge / aspects / phenomena described by specialized literature / own research published / presented etc. were taken into account. The course has similar content to the courses held by universities around the world. Through the activities of the course and the laboratory, the development of the graduate's skills to manage practical situations that he may face in real life is considered in order to increase his contribution to the improvement of the socio-economic environment.

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Date	Course lecturer	Instructor(s) for practical activities
	Prof. Dr. Dragos Nicolae Vizireanu	Prof. Dr. Dragos Nicolae Vizireanu
Date of department approval	Head of department	
Date of approval in the Faculty Council	Dean	